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OF THE

SOUTH CAROLINA

Agricultural & Mechanical Society,

HELD IN

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PROCEEDINGS.

Columbia, November 10th, 1869.

The South Carolina Agricultural and Mechanical Society met in the Courthouse at 7 o'clock, and was called to order by the President, who delivered the following address:

Gentlemen of the State Agricultural and Mechanical Society:

More than eight years have elapsed since the last meeting of the Society whose successors you are. For four of these the voice of peaceful industry was hushed amid the clash of arms; the energies once devoted to its advancement were directed to the preparation and wielding of the implements of war; and the accumulation of two centuries of labor was freely devoted to a cause in which all of it that was destructible perished. For other four of these years we have been recovering from this fierce paroxysm of civil strife, and have moved "as a sick man in his sleep."

It was the teaching of our States' Rights politicians, apart from its being so nominated in the bond, that with the maintenance of their dogma, the material prosperity of the Southern States was inseparably connected; of our theologians, that our system of labor had its sanction in Divine decrees; and recent experience in adjacent countries had shown that, without it, in tropical climates at least, a race composing one-third of our population could not be utilized, and would relapse into fetichism. What wonder, then, that at the results of the war our people stood aghast; that the emigrant spirit of their ancestors partially revived; that for a time the voice of Hope herself grated harshly upon the ear—that it became fashionable to be poor and patriotic to be despondent. But, thanks to the reviving energies of our blood, and the sunny skies and teeming soil with which a bountiful God has blessed us, to-day in productive capacity our glorious land nearly equals the value, if not the quantity, of the days of her prosperity. Time, which "makes all things even," has toned and mellowed the partisan exaggeration with which we held our peculiar views; and while with reverent loyalty we bury the dead past, we now accept the inevitable present, and stand ready to grapple with its difficulties. It is in this spirit you are to-day assembled—that you are here marshalling your forces for one more advance in the battle of material progress. Where are the gaps in our line? What means have we left with which to bear worthily our part in this renewed effort at prosperity?

The destruction of buildings, fences and stock, of capital invested in banking, manufactures and trade, of human life, and the time devoted to the war, or lost in the prostration that followed, is so much clear loss. It is idle to go into statistics to estimate it. We know and feel its magnitude; and time and labor can alone make it good. The loss resulting from the enforced change in our system of labor is, however, that which most prominently attracts attention—as involving both a loss of capital invested and of the means of recuperation. Let us endeavor to make some estimate of its extent. The capitalist desiring, under our old system, to invest $100,000 in planting, found that about $40,000 was required for land and stock and furnishing the plantation; while the remaining $60,000 was required for purchasing the community of laborers for the place—all of which were consumers, and something like half only of which were producers. With his business well managed, at the end of the year he found that 33 per cent. of the gross product of his plantation had been consumed by, or been expended upon this community—being in fact the wages of the labor of the producers among them—and his balance sheet probably showed a profit on his investment of from 4 to 7 per cent. from current income, with an addition of 2 to 3 per cent. to his capital from natural increase of his purchased labor. I feel assured that these figures nearly approximate accuracy, especially in the item of the annual cost of slave labor. A strong proof of this is to be found in the universal and simultaneous determining throughout the South upon the third as the proper compensation for farm labor when emancipation made the payment due to the worker himself, and threw upon him, and not upon the employer, the support of the community of which he was a part. Farmers, generally, do not trouble themselves much with the details of book-keeping, but most of them, by a lumping process, have a shrewd idea of how their business stands. They knew that they could hope for no reasonable profit, and pay more for labor than they had paid before, however the form of payment might be varied. Now suppose for a moment that after emancipation this community of laborers had remained undisturbed upon the plantation, and that their labor was as efficient as before. The income of the planter would have remained the same, and he would not have realized a change in his affairs, unless he endeavored to sell out and abandon the business. Then he would have found that he could no longer make a title to the largest portion of the investment in which he had placed his money. Individuals among us could and did often sell out to each other, and realize their slave capital. But to whom could a community of slaveholders—the State—sell out? And if the $60,000 was to remain an investment permanently locked up in the ownership of labor, it mattered not to the State (the labor remaining equally efficient) whether the employer owned the laborer, or the laborer owned himself. Nor can I see, if as supposed, the employer's income from his plantation remains the same after emancipation as before—if the percentage on land and slaves which tempted him into the business is now realized from the land alone—what he has lost by the change in the legal relation between himself and his laborers. He has lost the portion of his capital invested in slaves, but his land has appreciated to exactly that extent. He is getting from it the customary rate of interest upon the amount of his original investment, and continuing to do so, in a healthy and normal condition of public affairs, his land when sold would reimburse him.

These, however, are unfortunately not the results of emancipation in our case; and ignoring the potent influences of the political tinkering to which we have been so mercilessly subjected—the cause lies in the reduced efficiency of labor. The extent of this, and not the amount of the original investment in slaves, appears to me to be the true measure of the loss sustained by the change in our system.

The novelty of freedom has worn away, and the characteristics of the negro freedman as a laborer are now pretty well established. Released from the discipline of slavery, unappreciative of the value of money, and but little desirous of comfort, his efforts are capricious; and while at some kinds of labor the old slave tasks may be readily obtained, there are others in which no amount of persuasion or pay can keep him steadily up to the slave standard. He has, too, an aversion for steady work for his women and children, which nothing but the necessities of subsistence can overcome, and with the first gleam of prosperity, he remits them to idleness or to casual day labor. These characteristics have reduced the value of negro labor fully one-half, and the instances are exceptional in which plantations are worked now with less than twice the numerical force required before emancipation. The cotton crop, which, in the almost exclusively agricultural nature of our pursuits, is the best criterion of our industrial efficiency, is with difficulty pushed up to half its aggregate of the years before the war, notwithstanding the amount of white labor now diverted in that direction.

It is true that, when a full force of negroes is attainable, plantations are worked successfully, and with a larger interest upon the investment than formerly—the heavy bonus required in the procuring of labor by purchase being stricken from the account. But, gentlemen, we never had in the South in her best days a tithe of the labor necessary to develop even her agricultural wealth. Her rich mining and manufacturing resources were almost entirely neglected. Now, more than ever, population is our need, and population we must have, if we are once more to place ourselves alongside of the nations in the grand march of material progress. From the shores of Europe—our ancestral home—we must draw an accession to our numbers, which will fuse with and become part of us. No effort should be spared in that direction. It is our best and safest resource. But pending, or in default of their coming, from the teeming hive of Asia we must satisfy our vital need. Should the frugal and industrious Asiatic, as his habit has heretofore been abroad, prove only a sojourner with us—among us, but not of us, except in his industrial relations—his presence will have been a blessing to us both. And should he make this his home, there is no reason why we may not dwell together in the same harmony which has marked our intercourse with another race during all the vicissitudes of the years that have gone by since the first negro was landed from the Dutch vessel in James River. We have not found their presence here intolerable. Alongside of the Southern white man the negro wielded the axe of the pioneer; under his direction he advanced the productions of our agriculture, until the markets of the civilized world became tributary to it; during our desperate struggle for political independence, he supplied our commissariat; and in our efforts at recuperation from the ravages of war where would we have been without his presence—even with the efficiency of his labor depreciated as it is by causes perfectly natural to humanity? In pressing immigration, whether European or Asiatic, it is in view of the work before us, and in no spirit of hostility to the negro. I would exclude not one of them from this broad field of labor, nor withhold from him one particle of the fruits of his honest exertions.

We have thus glanced, gentlemen, at some of the losses sustained in the eventful period since the last meeting of an Agricultural Society in this State. But have we gained nothing? Will the habits of economy engendered by reduced circumstances, avail us nothing in the struggle for future wealth? Will the fortitude under disaster, the patient energy in retrieving it, which misfortune has developed, be worthless to us? Napoleon said that, in war, the moral was to the physical as three to one; and if this be true where brute force most avails, how much more shall the severe discipline our people have undergone aid them in attaining those victories which peace may achieve.

It is, therefore, with a hopeful and a confident spirit that I look forward to our future, and greet the organization of this Society as the first cheering glimpse of the coming day. Representing, as you do, all of the capital and intelligence that we have among us devoted to industrial pursuits, a grave responsibility rests upon each and every one of you, to see that, so far as in him lies, the good work goes bravely on. Weakened by the destruction of more than half of our resources; saddened by the memories of the past; oppressed by agencies in the present, over which we have but little control, the struggle may have in it a tinge of bitterness, but it has in it, too, something of the heroism that thrilled the veins while yet the red cross-banner floated in the breeze.

"Tell Governor Pickens," said Maxcy Gregg, as his life-blood ebbed slowly away upon a Virginian battle-field, "tell Governor Pickens that I cheerfully die for South Carolina." It is our fortune now, to owe as high a duty to the dear old State. We must live for her.

The President next called upon the standing committees for their reports.

Mr. John S. Green read the report of the Committee on Fertilizers, which, on motion, was ordered to be published.

REPORT OF COMMITTEE ON FERTILIZERS.

Mr. President: The committee appointed to report on fertilizers have been in great doubt how best to perform the duty assigned them. A subject so varied and so important under any circumstances, could only be treated in a most general and superficial manner in a report. Volumes have been written, and the best chemical science of Europe and America has been directed to it. To report on fertilizers is to report on a large number of the elements known to chemistry, besides innumerable compounds. But the difficulty does not cease here. In the organization of the committee no practical chemist has been named; a defect which has seriously embarrassed its action, and which must equally affect the value of the report. Under these circumstances, your committee must ask the indulgence of the Society for the very general and imperfect suggestions which they may present for the consideration of its members.

At the very outset, without any hesitation, your committee are of the opinion that the importance of using what are generally known as commercial manures upon our worn and badly-tilled lands of the Atlantic States, cannot for a moment be doubted by any one who has given them a fair trial.

According to Johnson's estimate of the agricultural products of England, its capacity to support its population would have been reached in 1860, when its population was estimated at 26,000,000. But, as he well says, "If we glance at the history of British agriculture during the last half century, from the introduction of the green-crop system or the alternate husbandry from Flanders into Norfolk up to the present time, we find the result of each successive improvement more remarkable than the former. The use of lime, a more general drainage of the soil, the invention of improved plows and other agricultural implements, the application of bone manure, and, more recently, of thorough draining and subsoil plowing, have all tended, not only to the raising of crops at a less cost, but in far greater abundance." England now supports her population of —— millions with ease by means of this improved agriculture, aided, as he says, "by sprinkling on its surface a small quantity of a saline substance imported from a foreign country."

According to the Patent Office Report of 1867, the proportionate cost of manuring an acre of land is as follows: By irrigation 12*s.*; by Peruvian Guano £1; by stable manure £3. It would appear, therefore, that, next to irrigation, the use of what are generally known as commercial manures, when properly selected and applied, is most economical, at least in England. And when we consider the larger areas cultivated in this country, and that the great cost of barn-yard manures is in the hauling and distribution, it would seem that the proportion would be much greater in favor of the commercial manures with us. Your committee, however, distinctly disavow any intention of raising the much-vexed question between home-made and commercial manures; but, on the contrary, would advise every one to make all the manure he can on his farm, and after that to buy at least five times as much, with the firm conviction that he will, at the end of the year, put money in his purse by doing so. We have deemed it necessary to say so much upon what would seem almost a self-evident proposition, because the past season has been most exceptional, and one in which many farmers may not have received a return in proportion to the expense incurred for the purchase of these manures. And just here one great difficulty of the subject upon which your committee has been employed suggests itself, viz: the selection of these manures. No general rule can be given which would indicate any specific manure as suitable to all soils and plants, and upon the supposition that a manure could be manufactured which would contain every organic and inorganic element necessary for the growth of vegetable life, it could only be used in the growth of any particular plant at too heavy a cost, and with probably very inferior results. In other words, your committee are of opinion that we cannot move forward with any certainty without the aid of the practical chemist; without him everything is vague and empirical. We must analyze our soils; we must analyze our plants, and we must analyze our manures, too often sold as containing qualities which they are very far from possessing.

Upon this subject your committee would recommend that this Society elect an Agricultural Chemist, with a sufficient salary to ensure his undivided and zealous attention. Almost every manufacturing house at the North has its chemist, and certainly the great agricultural interest of the State of South Carolina demands such an officer.

Although your committee enter with great reluctance upon the discussion of any agricultural subject which involves a minute chemical knowledge, still, in the discharge of the duty imposed upon them, they do not feel themselves at liberty to pass over the controversy in silence which has been raging between the respective advocates of the nitrogenous and phosphatic manures. The first being organic and the second inorganic, it would seem that there could possibly be no conflict between them; both being equally necessary to the healthy growth of the plant; and the only point to be ascertained would be the proportion which they should bear to each other; and this proportion would vary according to nature of soil and plant. For instance, in cotton where the ash of the seed contains nearly 46 per cent. of phosphoric acid, and the ash of the plant about 25 per cent., it would seem evident that a larger proportion of phosphatic manure should be applied than to corn and the cereals whose ashes indicate not half the amount of phosphoric acid as necessary to their existence.

The committee would call the attention ot the Society to sources of the supply of nitrogen hitherto not much used at the South, but extensively and profitably used in England, and now engaging the attention of the farmers at the North. We allude to the nitrates of potash and soda. These nitrates would appear to be much better suited to our climate and the crops which we grow than any application of ammonia. The great difficulty with ammonia is the immense loss, arising from its extreme volatile and soluble character; washed away with every rain, blown off with every wind, and decomposed by our hot suns, the waste is immense. The nitrates are not so easily decomposed; hence, we have it laid down by the best agricultural writers, that the nitrates are best for warm climates, and, we may add, clean culture and ammonia for cold climates and grass lands. Besides, the nitrate of potash would supply a great want of potash in our pine or sandy lands, and certainly could be used upon that character of soil with great advantage. We know one farm upon which it has been applied, and in spite of the intense drouth of the past season, everything remained as green and flourishing as in early spring, producing one and a half bales of cotton to the acre and sixty bushels of corn. Of course it is not pretended that this was the result of the saltpetre alone, but simply that it was a very important element. We have made inquiries as to what would be the cost per ton, but have not yet gotten the necessary information, although we can see no reason why the crude saltpetre could not be had at 5 cents a lb.

The newly discovered beds near Charleston assure us a bountiful supply of the phosphates, but the exhaustion of Chincha Islands of its guano, makes this question of the supply of nitrogen one of pressing importance. We must husband every source of this important element; and, fortunately for us, we have in the cotton seed a supply which, if not altogether sufficient, will go very far towards supplying our want. How can the best results be obtained from this seed? We think by expressing the oil from the seed and feeding the cake to our stock, or using the cake directly as a manure. We quote from Dr. Joseph LéConte: "The oil in the seed and the oil in the cake, contributes nothing to its efficacy as a manure. On the contrary, it is rather a hindrance, since it retards decay. It follows, therefore, that the cake is greatly superior to the seed, and that the more thoroughly pressed the cake is, the better." We have nothing to do at present with its value as a food, but if one-half be true that is stated by English agriculturists, and justified by scientific analysis, in this form of cake, the use of cotton seed must largely replace the use of corn in feeding stock; and furnish, at the same time, a manure nearly one-half as valuable by weight as the best Peruvian Guano. The present mode of using the seed is so wasteful as to call for prompt remedy.

Respectfully submitted,

JNO. S. GREEN.
THOS. DAVIS.
F. M. WANNAMAKER.

The President then called on the Committee on Cotton Culture, for their report. Mr. Jno. P. Kinard announced the report ready and requested his friend, Colonel E. S. Keitt, to read this report, which, on motion, was ordered to be published.

REPORT ON THE CULTIVATION OF COTTON.

The committee to whom was assigned the duty of reporting upon "The Best Method of Cultivating Cotton," beg respectfully to submit the following paper as the result of their conclusions.

In approaching the business of cotton culture, two general considerations should be regarded, one that of climate, the other of soil. Though cotton is the great American staple of export, and proclaimed a king in the commercial world, still no leading crop in the country has been so little studied by scientific men, and none cultivated with so little reference to fundamental principles of agricultural chemistry. In the United States, cotton is produced in the belt that reaches 40° north latitude to the Gulf of Mexico. In the upper part of this belt, between 36° and 40°, it is an exotic, and one-half or more of its productive power is cut away by a damp and chilly April and a frosty October. The capacity of the lands of the Southern States, for the production of cotton, is due less to soil than to climate.

In the relations of the mountains to the sea, and of the Great

Valley to the Gulf, into which its waters flow, is to be found the true secret of the rapid ascent of cotton to a great commercial and political power. The peculiar climate of the cotton States is supposed to be produced by the chain of mountains which intersect our country, the lower Alleghany range extending westward in the hills of Northern Georgia, Alabama and Mississippi. On these the moisture brought inland by the sea breeze from the Gulf and Gulf Stream is condensed and falls in showers of frequent occurrence, but not in long streams; these showers occur often in spring but rarely in midsummer and autumn, thus usually giving dry seasons for gathering the crop. The natural demands of the cotton plant require a tropical or semi-tropical climate that affords seven or eight months entirely secure from frosts, and may therefore be essentially termed a child of the sun that does not rejoice in copious moisture, and can thrive and come to perfection with less rain than any plant cultivated on the continent.

The thirty-second degree, or a line drawn across the Gulf States through Montgomery and Jackson, is the centre of the cotton belt, and for an hundred miles on each side of that parallel, north and south, especially the lands bordering the lower half of the affluents of the Gulf, and tributaries of the Mississippi, cotton is produced to an extent and of a quality surpassed by no other equal area of the earth's surface. This is its natural home; here is its chosen domain.

Having thus adverted to the peculiar influences of climate which prevails to such an extent in the culture of cotton, we now propose to refer to the different classes of soil most suitable, their preparation, with method of cultivation of cotton. There are three classes of soil well suited to the production of cotton. First, the soft argillaceous or rotten limestone lands of South Carolina, Georgia, parts of Alabama and Mississippi, and a small part of Texas. This description of soil is soft, fine and friable, easily washed away, and in many places entirely free from stones. The second class of cotton lands are the rich, black cane-break lands of middle Alabama, and the black rolling prairies of Texas. These are generally called the black lands, and cannot be surpassed by any alluvious for the certainty with which they produce crops. The alluvious or river bottoms are the third and most valuable class of cotton lands. Successive overflows have deposited on these lands an exhaustless bed of vegetable mould, with sand and wash from the hills, through which the falling rains easily pass to a porous subsoil.

The varieties of soil of South Carolina best adapted for cotton may be defined and classed as post oak and black jack lands, red mulatto and sandy lands. Any or all of these lands, where rolling, should be protected from washing by a system of circle ditching and plowing, as upon this practice with manuring, depends the preservation and restoration of our cotton lands.

We refer next to the preparation of the soil with planting and cultivation. The plows should be started just as early in the spring as the season will permit—say by the first of February, commencing with the rolling or red lands, which will often be found dry enough; the same may be said of the lower counties of Carolina.

Generally, the direct preparation for a crop commences with February. If the breadth was planted in cotton the previous year, it will be necessary to keep a hand or two in advance of the plow with hoes or clubs to break down the old cotton stalks, or pull them up by the roots, and throw them into piles for burning. The stalks are easily broken in cold weather, but where they are not of very rank growth, may be plowed in. Where cotton was the previous crop, and no change in the width of rows is desirable, run a furrow between the ridges in the middle of the old rows with a shovel six or eight inches wide, and as deep as possible with one horse. In this furrow apply the fertilizers or whatever manure used, after which with a subsoil scooter, ten or twelve inches long, run on each side of the furrow containing the fertilizer, throwing dirt equally from each side into this furrow. Follow in the scooter furrow with a good turning plow, making a ridge. This plowing should be finished before time for planting, after which, and immediately before planting, "the middle" should be well plowed out with a wide shovel. Should the beds have been finished when the fertilizers or compost was deposited, and have become foul and hard, a harrow should be run over them before planting. By beginning in time, it may be desirable before completing the preparation for planting to run two furrows in plowing out the middles, first using the scooter, followed in the same furrow with a good turning plow. For this work the first furrow should break the land fully as wide beneath as at the surface. When it is desirable to plant in the same rows as the previous year, first run a furrow on the old rows to plow up the stalks, then follow with a scooter, afterwards again, with a wide shovel, opening the furrow sufficient for the fertilizers. To improve and restore our lands to a high state of cultivation, we should adopt a thorough system of planting, by deep plowing in preparation, good manuring, and proper cultivation. Where the previous crop was corn, wheat, or any land that was not in cotton, the plowing should begin early, as we very seldom derive benefit by turning over land in the fall.

Indeed our experience teaches us not to turn over the soil to a great extent at any time. On this land which was not cultivated in cotton the last year, we will commence by breaking with small shovels, followed in the same furrows by subsoil scooters, breaking the soil beneath as well as at the top. When, at the proper time the manures should be deposited, the rows are laid off by running deep furrows at the proper distances apart. These distances are to be determined by the nature of the soil—say from four to six feet on strong bottom lands, and three to four feet on light land.

We next throw two furrows together with a turning plow upon the furrow containing the manure. The plowing should be continued until all the space between the rows, or the "middles," as they are called in cotton parlance, are plowed or broken, by throwing up the soil upon the beds on each side. The prevalent custom has been not to "break out" these middles at the first plowing, but to do it afterwards in the course of cultivating the crop. On lands that have been thoroughly cultivated, this omission is probably immaterial. After the plowing the ridges or beds should remain some little time that the soil may be settled by the spring rains. We do not approve of planting cotton in the hill, for the reason that where a quantity of good manure, either compost, guano, or chemical fertilizers have been used, a species of fermentation is produced which destroys the vitality of the cotton plant. This effect was carefully investigated some years ago by Dr. Cloud, a cotton planter of Alabama, who did more for the true and scientific culture of cotton, and gave a more patient investigation to all the details of successful cotton-growing, than any other Southern writer.

The varieties of cotton and the different kinds of seed, will be adverted to hereafter.

Planting commences about the tenth of April, or a week or ten days earlier on dry red lands, and may be delayed as late as the tenth of May, and good crops produced. But any delay after the middle of April must abridge that much from the cotton picking season, for four or four and a half months must be allowed for the growth of the cotton plant.

The seed furrow should be opened very shallow with a bull-tongue plow, the seed dropped thick and covered very lightly with a board. To make the seed furrow straight, and have an even trench for the seed, we have used with success a triangular piece of wood, with the narrow edge down, attached to the foot of the plow, following the trench made by the bull-tongue. Cotton needs only a light covering—an inch being sufficient—which should be done with a board fastened to the lower part of a light plow. This board should be of some hard wood, an inch or more thick, about eight inches broad and thirty inches long, bevelled on the lower edge, and cut in a curve so as to fit the ridge. It is essential, especially where the planting is delayed, to roll the seed in a fertilizer that will hasten the germination. An equal mixture of lime and ashes, or two parts of ashes to one of common salt is recommended; others have soaked the seed in salt dissolved in liquid stable manure, and afterwards roll in plaster—which is preferable, as the plaster separates the seed, which, otherwise, tends to mat together, allowing them to be dropped more regularly in the seed furrow. In planting, the seed should be drilled by careful hands, using from ninety to one hundred pounds, or three bushels to each acre.

We have observed for several years past improved cotton planters, which performed the work very well, with a considerable saving of seed as well as labor. More attention will, probably, be devoted to these improved cotton planters hereafter. There is no reason why the whole operation should not be performed with one implement.

The committee in reporting the best metnod of cultivating cotton, are aware of the diversified opinions on this subject, and submit their results and conclusions with deference and respect to the intelligent and successful cultivators of the great staple in our State. In ten days or two weeks from the time the seed was drilled in its narrow bed, the planter, walking over his cotton-field, may expect to see a row of tiny leaflets just bursting out of the moist earth. If the interval has been wet and cold, anxiety is mingled with his hopes, for so many of the seeds may have rotted as to give him only an uneven and irregular stand. Where the stand is thus deficient, the question of replanting must be decided in a day or two, for time is now precious, and every week lost at this end of the season is just as much subtracted from the length of the picking season. If he has planted thick and the stand is a fair one in most places, the chilled seeds in the damper soil may yet come out and do well. He first sees two leaflets, and in about three days the third appears; as soon as the third leaf is developed the cultivation begins, and here, at the very outset, the difference between careful and slovenly planting of the seed will appear. Where the seed are dashed carelessly into a wide and somewhat irregulor furrow, the line of plants will be correspondingly irregular. If, on the other hand, the furrow or drill was small and sharply defined, and the seeds drilled neatly and straight, the work of thinning out and cutting away to a stand will be very much easier. Of course the first thing to be done, where the sprouts are very thick, is to cut away the superfluous plants, and concentrate all the fertilizing powers of the soil upon the most thrifty specimens. Our practice, just here, is to "run around the stand" as it is called, that is to carry a small furrow with a side plow close up to the crest of the bed on each side, very shallow, and not leaving the bed more than three or four inches wide where the cotton stands. Our experience is, that the roots of the plants require the sun early in the spring, and where the plowing is properly done, the thinning out, or chopping out as it is called, can be done rapidly. The hoe-gang pass along behind the plows, chopping out quite a gap from six to twelve inches, according to soil, and leaving three to four plants together. Where the plants have sprouted with uniformity, the work being mostly mechanical, can be done very fast. As a rule it does not pay to be very particular this time over the crop. It will not do to linger. Let the hoes pass on rapidly. While the hoe-gang are finishing the last rows, let the plows go back where the planting began, and start in for another working. This time the dirt must be thrown up from the middles toward the plants—yet not so as to choke them, or bury the roots too deeply. For this plowing we use the sweep, made to run very shallow and light. If the "middles" have become foul, they should be plowed out. Let the hoes follow, cutting away all the plants but one, the most thrifty of each clump, and throwing a little fresh earth around those that stand, taking out all the grass and weeds. This working should be more careful than any which the crop receives. Cotton is jealous and exacting in its nature; it must have attention, or if the plant does not die amid the grass, it soon looks yellow and sickly, and its bearing will be abridged three weeks or a month. The industrious planter, twice over his crop, and the plants thinned out to a final or permanent stand, the rest is comparatively easy. The plow must continue to run, and the hoes to follow; but here we must remark that the cultivation varies with the seasons and the situation of the land. If the rain fall is excessive, so as to form a crust around the roots, it is advisable to carry a shallow furrow near the stand, so as to break up this crust, and allow the air and sun to strike upon the roots of the plant. If, on the other hand, the season is uncommonly dry, it is best to put a large plow or a sweep in the middles, and throw up a bed of dirt that will protect the roots. Cotton is a plant that loves heat, and does not demand large supplies of moisture.

An excess of moisture or heavy rains, followed by a fierce sun on flat lands, when the plant is young, is apt to breed lice upon it. This is the first enemy from the insect world that the planter has to meet. A few days later the same state of things will produce rust upon cotton. In our opinion, the remedies for these diseases of the cotton plant consist in rapid working, and the improved and scientific culture of cotton. Where the lands are flat, the beds should be raised, so as to keep standing water away from the roots of the plants. In regard to the shape and weight of the plows used in cultivating a cotton crop, there is much variety of opinion, and perhaps much room for improvement. We deem the ordinary light wooden plow best adapted for the purposes with the present labor, as there is no necessity for deep plowing where the lands have been thoroughly prepared. The sweep or eagle plow, with shovel and bow, and cultivator, making furrows one to three inches deep, and as wide as desired, answers all the purposes of the cotton-grower quite well.

During the latter part of May, June, and the early part of July, it is important to press the growth of the plant, and nothing does this so effectually as frequent stirring of the soil. As a rule, the planter thould manege so as to get over his crop once in ten days or two weeks. The true policy is to push the growth of cotton just as rapidly as possible, until the branches interlock, and then let the vigor of the plant go to making and perfecting bolls.

When the plant approaches maturity in size, that is, when the branches are beginning to interlock across the middles, it is doubtful whether the plow can be of much benefit. Deep plowing at this stage is clearly injurious. Besides the tap root of the cotton plant, which runs directly down, it sends off side shoots or sprangles sufficient to be much broken by a plow, or other implement, that runs more than two inches below the surface. The breaking of these roots checks the advance of the crop, and tends to produce a second growth, the bolls of which will be immature at the coming of frost. The chief improvement on the old modes of culture, that can be made, is in the rapidity and evenness of planting, and in the first working. On cotton, planted early, or by the middle of April, and well tended, the blossoms begin to show by the middle and last days of June. If the previous cultivation has been thorough, the crop can be laid by the last of July. In August the picking season is at hand, and harvesting should begin, when a picker can gather fifty pounds.

There are two leading varieties of cotton grown in the South, viz: the Long Staple or Sea Island, and the Short Staple or Upland Cotton. Of the latter, nothing more need be said than that it is grown almost exclusively throughout the cotton region. The seacoast of South Carolina, Georgia and Florida, with the adjacent Sea Islands is the most favorable part of the United States, as regards both soil and climate, for the production of "Sea Island Cotton."

Edisto Island is preferable, as it is the most productive of any part of the Sea Islands or coast, for the production of the Long Staple. Sea Island Cotton is planted from March 20th to April 10th, upon beds five feet apart one way, by from eight to twenty-four inches the other, according to the richness of soil. It is cultivated very much the same as Upland, except that more reliance is placed upon the hoe and less upon the plow. The cultivation of the Sea Island is local, and the amount produced in this country, as compared with the Upland or green seed, is as one to one hundred.

Within the last four years, there has been quite a demand for improved varieties of cotton seed, which has probably enabled a number of enterprising planters throughout the South to realize handsome fortunes. It is certainly practicable for every cotton-grower, by selection, improvement, and judicious cultivation, to produce an improved seed. In general, it may be said that cotton is improved by cultivating the plant in the best manner, and then selecting from each stalk those bolls which are the largest, the finest, and the most perfectly matured. Probably as much depends upon locality as upon any other circumstance, with respect to the improvement of cotton seed. Choice varieties have never grown from the rank, moist lands of the Mississippi valley, but we have known of the best varieties of improved seed to come from the vicinity of Vicksburg. Every cotton-grower who cultivates a good cotton soil can, in a few years, produce a choice variety of cotton seed by taking pains with any of the ordinary seed. In selecting, which is from the bolls that open before frost, regard may be had to the number of bolls upon the plant, or to the fineness and softness of the sample. By selecting the former, he may produce a seed famous for its productiveness; by taking the latter, the variety may have a high repute for the superior quality of the lint. All the improved varieties are quite certain to deteriorate or run out in a few years unless the same pains are taken to sustain the character of the seed that were used to produce it.

With cotton at an average of ten cents per pound, the South for thirty years before the war was rapidly increasing in wealth; now, with cotton at more than twice that price, it is not credible that political differences and uncertainties can long arrest the march of the great laws of political economy. It requires little sagacity to predict that this transition state cannot last long. Society is rigidly controlled by its material interest, and there must be a large influx of both population and wealth into the Cotton States.

The South should produce the greater part of the plainer and coarser fabrics necessary for her consumption. The only difficulty to be overcome in order to the establishment of an effective and adequate system of manufactures for the South, is that of population. Operatives are wanting, and those from the class from which operatives are produced. But a large immigration of people, not wedded to the culture of the soil, will enable the South to do more than manufacture her own clothes. The enterprise and outlay to enable her to do this being moderate, the immense advantages to be secured by such a cause must be forced upon the attention of the citizens of our own State, who are guided by a wise and enlightened self-interest.

The experience of the world, since the outbreak of our civil war, has established the great superiority of the South as the cotton-growing region of the world. But we claim, for the State of South Carolina, a superiority over any other Cotton State, from the fact that the short staple cotton is never affected by boll worm, caterpillar, etc., nor overflows by high water, never failing to make cotton crops. And, as we have stated before, by proper cultivation and a proper system of manuring, we can very easily make our lands produce two bales of cotton to the acre. South Carolina is the garden spot of the world.

In South Carolina we have vacant lands enough to support more than double her present population; and here thousands of acres await the onward march of that grand army of laborers that shall level the forests, turn the sod, plant, cultivate and gather the crop, whose snowy fibre, twisted by billions of spindles, shall form the clothing of the race.

Let us not despond, but go to work patiently to develop our resources, increase our productions, save our money, and, last, restore our State to its former greatness and power.

Respectfully,

JOHN P. KINARD,
R. A. McCASLAN, } *Committee.*
E. H. DOWLING,

Mr. Waties, on behalf of the chairman, Dr. J. W. Parker, read the report of the Committee on Corn Culture, which was accepted and ordered to be published.

REPORT ON CORN CULTURE.

In performing the duty assigned me by the Agricultural and Mechanical Association, I propose, briefly, to give my own experience with the result of two or three experiments. As early as the year 1827, I became convinced that in the event of drouth in summer, the ordinary method and routine of planting corn in my neighborhood, was ruinous in its results, entailing on the planter the necessity of getting his supply elsewhere than from his own field. Acting upon the suggestion derived from books on agriculture, I took for my first experiment a level much-exhausted red-clay field, which produced not five bushels of corn per acre the preceding year.

About the first of December, I started the work of plowing and subsoiling with bull-tongue plows and an old-fashioned Coulter, running two of the former to one of the latter, thus subsoiling every alternate furrow.

Early in February the field was laid off four feet each way with a 7-inch shovel, followed by the subsoil plow. In each check a small shovelful of a compost of cotton seed, stable manure and the scrapings of the lots, was put and covered with a tongue plow. In March the field was planted in corn, the seed having been soaked in a solution of saltpetre, and was covered with hoes to the depth of about two inches. As soon as the plant attained the height of three or four inches it was thoroughly plowed with tongue plows and followed by the hoe hands. It received two other plowings with short shovels, and was laid by before the tassel appeared. The cultivation was level, rather drawing the earth from than to the stalk, at the early stage of its growth.

The contrast between this and other fields around, during a hot and dry season, was striking. In this field the vigorous growth and dark green blades gave but little indication of drouth, while in many fields around, the plant was literally being scorched to dryness.

The product was put down at twenty-five bushels per acre, being a gain of at least twenty bushels per acre over the preceding crop.

From the foregoing experiment we learn the beneficial effect of opening the soil for the reception and retention of moisture during the winter, the better pulverization by freezing, and adaptation of the soil for the ramification of the lateral roots of the corn.

It is remarkable that this method of preparing the soil so successfully practiced among the ancients, should have been lost sight of in our country until within the last forty or fifty years, and what is more strange, but few farmers of our day know from their own experience anything of the benefit derived from deep plowing in winter or fall.

In the foregoing experiment the error committed was in putting the manure in the hill, instead of plowing it in the land broadcast. When manure is put in the hill the plant is vigorously pushed forward, and attains a great height before the shoot appears, and then commonly within three or four blades of the top, consequently distant from its source of nourishment below, and with but little protection from above. Take carefully that stalk from the ground and immerse its roots in clear water and remove all dirt. You will observe the roots confined to a small circumference, all seeming to grasp the food just at their exit from the stem, and comparatively but few lateral roots. When the manure has been properly plowed in the land broadcast, the plant at first does not make such rapid headway, but from a wise provision of nature, the lateral roots are being sent out with their thousand mouths in search of food and moisture. They find all that has been bestowed by nature or by the hand of man, and the corn begins to shoot about the time the roots are in condition to bestow their treasures for its support. Just at this important crisis in the growth of the crop, it has been urged by old planters that the ground should have its last good plowing. I have seen more than one field of luxuriant corn thus ruined. Common sense should admonish the plowman to stay his hand, and leave undisturbed the delicate little veins or roots in the discharge of their important functions.

To gratify my farmer, as well as to convince him of his error, he was allowed to give what he termed a finish with the plow, and hoe to a dozen rows—the result was a decided falling off in yield. The foregoing experiment shows that with the proper preparation of the soil, four feet by four gives sufficient distance on and upland, that the preparation of the land and first plowing to the crop should be deep, and all other cultivation shallow and level.

My next experiment was of more recent date, and on land very different in character from the first, being nothing more nor less than a quagmire, near by the City of Columbia. It was grown over with rushes, willows and sour grasses, abounding with snakes and malaria, through which a serpentine branch made its sluggish way.

My first work was to secure thorough drainage by means of a canal and underdrains, then to clearing and levelling, and third to lime and break up with a two-horse plow, all of which was the work of the summer. In November a heavy coat of cow house manure was applied and turned under with a two-horse plow. In January the same process was repeated and again in March, and the subsoil plow used. In April it was necessary to plow under a luxuriant growth of weeds, lime being first applied as at first. In May the hands were again on the ground with manure carts, two-horse plows and hoes; after plowing another coat of manure in, the land was harrowed perfectly level, and laid off thirty-six inches apart; throughout each furrow Peruvian Guano, salt and plaster were sprinkled at the rate of 200 lbs. per acre of each. The seed corn, after being soaked in a solution of nitre, was rolled in plaster and dropped ten inches apart in the rows, covered with rakes and the land rolled. Five days after planting, this corn was up and growing. As soon as it was large enough to bear plowing it was run around with a long, narrow plow, followed by the hoe. There was nothing remarkable in the culture of this lot; it was kept clean by shallow and level culture until it began to shoot and tassel; *irrigation* was then resorted to by conveying from a reservoir a gentle flow of water through every alternate row. Thus the land was kept moist and the plant in a growing state.

The Agricultural Society awarded the premium for the largest yield to this lot, there being 147 bushels per acre produced on two acres.

The following year the same experiment was repeated, except that the rows were thirty instead of 36 inches apart.

Inasmuch as there were doubts entertained as to the correctness of the first crop, we were the more careful in having a larger committee to measure and report on this. Their award was the first premium as before, the yield being 200 bushels and 12 quarts of good corn on a single acre. The land was surveyed by the City Surveyor.

From the foregoing remarks and experiments the following conclusions may be drawn:

That success in corn growing depends much upon the thorough preparation of the soil during the fall and winter, which consists in—

1st. Deep breaking up.

2d. Underdrainage on moist flat land.

3d. The judicious manuring.

4th. That the first work should be deep; subsequent work shallow and level.

5th. The roots of the corn should not be disturbed after it bunches to tassel.

Under the old method of culture, the question has arisen whether or not corn can be made a remunerating crop. I should say on our old plantations it cannot. On the other hand by improved culture the effects of drouth or scalding from too much rain can be overcome, and instead of harvesting fifty per cent. less than an average crop, as is the case the present year, there would, doubtless, be an increase of fifty per cent. over the average of past years, on the same area of ground. The question would then be responded to affirmatively, and demonstrated by evidences everywhere of increased prosperity and domestic comforts. Fat stock of all kinds would give evidence of full barns, and the old adage would be verified: "It takes corn to make cattle and cattle to make corn."

J. W. PARKER.

Mr. Woodward read the report on Pisciculture, which was accepted and ordered to be published.

REPORT ON PISCICULTURE.

Mr. President and Gentlemen: It cannot be denied that failure, in most instances, has been the result of our efforts in pisciculture, nor is it to be wondered at when we reflect that little of experiment, and less of system, have been practiced.

In all branches of science, or of the commonest avocations in life, success has only been attained after a series of experiments, which have resulted in a well-matured system.

This has not been the plan pursued by the owners of fish ponds,—in fact there has been no plan. The only idea seems to have been: first, the construction of a puddle of water somewhere, and then the indiscriminate heaving in of all varieties possible to be obtained.

A farmer who would embark in sheep husbandry, by procuring a flock of sheep, and a pack of wolves, to run upon the same pasturage, would be counted a madman, and yet those of us heretofore engaged in *fish husbandry*, have been guilty of a greater folly.

Some of the causes of failure are as follows: ponds have been made too small; sufficient attention has not been paid to feeding; varieties the most antagonistic have been crowded together; but the greatest cause of failure has been in the fact that *no* attention has been paid to the separation of the larger and smaller fishes into different reservoirs. Nature has alone been relied upon to raise fish for us. Nature is not alone relied upon to raise stock or crops; we deem it advantageous to aid her in her efforts.

That *big fish* swallow up *little fish* is true in the piscatorial world as elsewhere, and has been well known from the days of Jonah. But few, I dare say, are aware of the wholesale slaughter committed upon each other by fishes even of the same species.

In illustration take the Red-Bellied Perch, (*Pomotes Erythogaster*,) a fish common to all the fresh waters of the State, and probably well known to all of you. The female of this species is capable of laying from 600 to 1000 eggs at a spawning, (probably double this number, though I have not counted,) and in my opinion spawns several times in a season; in any event the spawning is kept up from the first of June till the last of August. It is patent, then, that several broods appear, varying in size according to age; in fact, where a few hundred of pairs of breeders are on hand, *thousands* of fry make their appearance daily during the entire season.

The fish, when first hatched, is nothing but an egg with a tail, showing, under my microscope, neither eyes nor respiratory apparatus for about two days after birth, and only occasionally propelling itself above the sand on the bottom of the bed. It is then quite helpless and remains so as long as the umbilical egg adheres, say for one week whilst in the bed, and for another week after it has left it.

Under favorable circumstances the young at one month will show a length of ¾ to 1 inch, and are now capable of doing the greatest damage to the pond, as they mercilessly devour not only the eggs from the beds, but also myriads of the fry, whilst they are yet incapable of successful flight.

My experiments during the past season were with individuals of these older broods, caught at the pond and transferred to glass jars and a small aquarium in my house. In putting in others of smaller size I noticed that they rapidly disappeared, and it occurred to me that I would see how many would be consumed per fish per day, so I procured eggs from beds in the pond, and hatched them in some instances in soup plates on the mantle-piece. These fry were then dipped up with a spoon and poured into the vessels with the larger fish, (which did not exceed one inch in length,) when, to my astonishment, I found that an average of fifteen per day were eaten by each specimen.

Now, gentlemen, reduce this to figures, and I will compute that only one thousand reach the age and size of one month; this thousand is capable of destroying, and do destroy, 15,000 fry per day for about sixty days, equal to 900,000 perch, by the young of their own species alone. In England, the loss of one female salmon heavy with eggs, is computed at twenty tons of fish, even allowing for accidents. My estimate for a whole pond where there may be thousands of pairs of breeders, is certainly then not overwrought.

Nine hundred thousand perch at three years old, in a good mill-pond in Orangeburg, or in any other of the lower districts, would easily weigh ¼ of a pound, without being fed artificially. This would yield (with 125,000 barrels thrown in for good measure) still 100,000 barrels of food. There are few of us, I dare say, who would not regard even the hundreth part of this sum as amply repaying for the construction of a pond. I have accounted for a loss of 900,000 perch by the *young* of their own species alone. The young and old of numerous other families destroy even more than the Red Belly, (I have seen what we know as the trout, only 1¼ inches long, swallow sixty-one silvers in twenty-four hours,) and thus the Kilkenny fight goes on, hundreds of these little destroyers being in turn gobbled up by larger fish. Nor is this all; there are still otters, musk-rats, minks, snakes, cooters, the whole tribe of cranes, several species of ducks, king-fishes, hawks, divers, and man with his improved appliances of nets, traps, and hooks, to keep up this relentless warfare.

It is then not remarkable that failure and disgust have followed the undertaking in numerous instances. It is almost as poor a business as hog raising, under the present unfortunate condition to which the State has been reduced by misrule.

But it is certainly very encouraging to know that in many parts of the State, fish, even in a state of nature, are still quite plentiful, and no more convincing proof of their wonderful prolificacy could be adduced.

We must then find a remedy, that is, we must do as is done in every department of stock raising and agriculture, *aid nature;* and I will commence whilst the fish is yet in the egg. Thousands, hundreds of thousands of eggs, naturally impregnated, can be procured from the beds around the edges of the ponds during the spawning season. This does away with the tedious and delicate operation of artificial fecundation, and a little experience will enable any one who will wade near the beds to discover when eggs are present, by the lumped appearance of the sand at the bottom. Scoop this up gently with both hands, and the eggs will be found adhering to the grains of sand by a glutinous substance, or if the operation of searching be deferred too long, the eggs will be found capable of locomotion. Place sand and eggs into a basket or other vessel carried for the purpose, exposing them as little as possible to the air. We are now ready for hatching.

I have hatched them in soup plates, and in aquariums, but would advise wooden boxes, so arranged that the water from one would pour over into another below, and so on. These boxes should have clean sand bottoms, with about twelve inches depth of water, and should be large enough to allow of the eggs being spread out, so as not to crowd each other, and should be fed by a very small stream of water, say as large as the finger, this passing through a strainer to keep out all sediment. The water upon the eggs should be as nearly as possible of the same temperature of the pond whence the eggs were carried.

These precautions being taken, you may confidently expect the appearance of the fry in from *three* to *six* days. I will here remark that this plan will apply equally well to what we call trout, the bream, the mawmouth and the speckled perch, as they all bed in shallow water, and nearly about the same time—the trout earlier than the others.

Our next care will be to provide for the safety and subsistence of the brood. For about one week no food will be necessary, as the fish is fed by the umbilical egg, and for this time may be allowed to remain in the hatching boxes. After the eggs have been absorbed, they should be transferred to larger ponds, tanks or reservoirs, with water enough passing through to keep them pure, a surface of about ten feet square, and a foot or two in depth, being sufficient for probably ten to twenty thousand fishes for some time. Here they should be regularly fed upon boiled fresh meat, rubbed through the bottom of a sieve so as to render it suitable to be swallowed, meal cooked into mush, and, as they grow larger, upon bread and hominy crumbled up as fine as possible. Beef liver boiled, and passed two or three times through a sausage cutter, I have found to be excellent—some one recommends the heart of beef, or sheep, or hogs, treated in the same way—in fact is difficult to find anything eaten by man that is not good for fish, provided they can swallow it. Curd is said to be excellent; worms, maggots and insects of most kinds are eaten with avidity. The smaller the pond into which they are are transferred, the more it will be necessary to feed, of course; but we have this consolation, that fishes, of all animals, yield most bulk in proportion to the food given them. Fish of the same size cannot, of course, swallow each other, nor can a larger fish swallow another of smaller size, but yet too large to be received into the mouth; hence, when your younger perch has attained a width of about one inch, the older ones cannot eat him, and he may safely be turned into the large pond.

This, then, is the whole mystery—keep only young fish of the same size in the same pond.

In selecting the Red Belly for my illustration, I do not wish to be understood as giving it preference, for although there is none of our fishes better suited for pond purposes generally, yet it has this one great objection to it, it requires too much time to get ready for the table. I have raised what we call the trout here to a length of over eight inches, and weighing five and a half ounces at one year old. This was done with no other food than was procured by the fish in the pond, and I am satisfied that they can be made to increase in a much larger ratio during the second year. A perch at the same age is usually not over an inch wide and about two and a half inches in length, not having been fed artificially.

What we want for the pond is a fish that will mature in one year, and I do believe that if an interest can be awakened in the subject, we have fishes in our midst which, under a proper system, can easily be made ready for the table in this time.

The Rev. Mr. Ervin, of my district, has matured the Gold fish in two years, and believes that they attain their full growth in one. This experiment was as follows: He placed seven gold fish in his pond, and in seining two years after caught two hundred full grown specimens of beautiful size for eating, about ten inches long and as thick as the wrist of a large man; and not the least remarkable fact related by him, was this: that a gentleman present carried one rolled up in paper in his pocket near eight miles to exhibit to his family, and had the satisfaction of seeing the fish revive thoroughly after his arrival at home.

What we know as the Trout (*Megastoma Caroliniensis*) is one of the finest fishes of the United States, well adapted to the pond, and can be made large enough for table purposes in two years. It requires a large pond, or rather a series of ponds, of not less than an acre in extent, and thrives best on *fish* diet, though it eats raw beef, worms and flies with avidity, and attains a weight of ten lbs.

The Bream (*Pomotis Cerulia*) is, I think, the best pan fish in the world, but is slow of growth, very shy, and quite a capricious biter.

The Mawmouth (*Pomotis Megastoma*) is a hardy fish—lives well in almost any water, from the purest to the most stagnant, but like all the *big mouths* has a strong *hankering* for fish diet. It grows faster than any other of the perch family, and will eat anything, and, upon the whole, is a good fish.

The Speckled Perch (*Pomotis Vulgaris*) is about on a par with the red belly—not so voracious, and, I think, not so fine in flavor. This great objection, however, is urged against the whole perch family—they do not grow fast enough.

There are two varieties of Sucker, whose names I do not know, that attained a fine size with me in two years, and which, I think, live principally on mud and moss, devouring a few eggs from the beds as opportunity offers, and during the winter and spring are as fine fish as could be desired. They are caught with gill nets principally, but also *bite* during the winter at a mush and cotton bait.

The much abused Cat will surprise any one who will feed him for a year, and he can be raised either in a *wash tub* or a large pond, as may be preferred.

There are numerous other families common to us and suitable to ponds, all of which should be experimented with.

My own impression is that the best pond fish, when found, will be some variety of the numerous species of the genus Suckers—a fish that is not carniverous, but lives upon mud, moss and such things as are natural to the pond. The whole family of sucker whilst eating mud, etc., are exceedingly fond of raw meal, mush, hominy, bread, etc., from the huge buffaloes of the western rivers to our own branch variety—and no food is easier of access to our farmers than the above.

Let us then, gentlemen, experiment upon this certainly interesting question, believing, as I do, that success in this, as in other branches of industry, will crown the efforts of him who will expend the proper amount of energy. One other plea for fish ponds and I am done. They may be made available for *ginning*. Few persons are aware how little water upon an overshot wheel will gin their cotton crops. If you have not water enough for a fifty saw-gin, use a forty or a thirty saw—this latter, with light gearing and an incredibly small amount of water, will easily yield two bales per day, which will now suffice for the crops of most us. Our gins have, heretofore, been too heavy. The dilapidated and scarred condition of our mules after the ginning season, has long convinced me that it costs more to gin a crop than to plow it. With an apology for trespassing upon your time, I am, respectfully,

T. W. WOODWARD,
Chairman Committee on Pisciculture.

The Committee on the Sorghum Works, at Greenville, reported; having published their report in the several papers of the State, they considered it unnecessary to have it read again.

To the President of the South Carolina State Agricultural and Mechanical Society:

The committee appointed by the last Convention to visit the Sorghum Works of Messrs Passmore & Wilhelm, at Greenville,

S. C., beg leave to report that on Monday, the 8th instant, the majority of the committee, in company with a number of gentlemen of intelligence and agricultural experience, visited said works, and took pains to observe minutely every stage of the process of manufacturing syrup and sugar from the black Imphee, grown in the immediate neighborhood of the works.

As the result of their observation, the committee unite in saying that they are satisfied as to the value of the process.

There is no doubt that a superior quality of syrup and sugar may be produced by this process, (which is known as the Southern process,) from the black Imphee, grown on our own soil.

We therefore take pleasure in recommending the process to the favorable consideration of the Convention. We believe that its adoption by the agriculturalists of the South, generally, would furnish a profitable branch of industry to our people, and add largely to the resources of the country.

We have deemed it proper to make this report, inasmuch as in our former report we were unable to speak from our own observation of the value of the process for making sugar from cane grown on our own soil.

J. P. MOORE.
T. Q. DONALDSON.
L. WILLIAMS.
B. Z. HERNDON.

Greenville, S. C., November 9th, 1869.

We were present with the Committee on the Sorghum Works of Messrs. Passmore & Wilhelm, on the 8th instant, and witnessed the process of manufacturing Imphee into syrup and sugar; and we take pleasure in certifying that, in our judgment, the process was entirely successful. Both the syrup and sugar were of a superior quality, and we believe if the process were generally adopted by our agriculturalists it would add largely to the resources of the country.

W. S. E. EASLEY.
W. T. SHUMATE.
W. H. McDANIEL,
J. C. C. TURNER.
E. J. BRYAN, Rutherfordton, N. C.
WADDY THOMPSON, M. D.
J. A. DAVID.

Col. John B. Moore read the report of the Committee on Improved Agricultural Implements, which was ordered to be published.

To General Hagood, President South Carolina Agricultural and Mechanical Society.

SIR: Your Committee on "Improved Agricultural and Labor-Saving Implements," in the discharge of their duty, report.

That the subject naturally divides itself into two heads:

1st. The advantage and necessity of improved mechanical appliances to agricultural pursuits in the State; and,

2d. A report of such improved Agricultural and Labor-Saving Implements, and the results attained by their use, as the committee have been enabled practically to test during the past year.

Your committee feel they can, under the first head, add but little that would be of any interest to the members of this Association to what has been said in the exhaustive essay on this subject which forms the leading article in the November number of THE RURAL CAROLINIAN, the organ of this Society, to which the committee presume every member is a subscriber, and to which they feel, from its intrinsic merit, every one should be. Examples might be multiplied from English and American authorities, from certificates of individual farmers, from reports of commissioners, etc., of the increased yield of agricultural products from deeper and more thorough tillage of the soil—a result only to be attained economically, if at all, by the use of improved implements, and the superseding the costly and uncertain hand labor by the more economical and certain animal and machine labor. But this would be superfluous work and a useless waste of time. A great cry has gone out from the South for more labor. Any traveller upon our highways and byways, however superficial may be his observation, can see the reason for this in the hundreds of thousands of acres of our most fertile lands, in whose bosom reposes untold wealth, lying waste, a prey to noxious grasses and worthless weeds; and in the poor and scanty produce of our fields, which, from imperfect and uncertain cultivation, barely pay, at a greatly enhanced price, for our staples, the expense of their tillage. How is this want to be supplied? Your committee believe to a great extent by the introduction of more perfect and more powerful implements of culture—from the two-horse turn plow and two-horse wheeled cultivator—relieving us of one hand, and doing the same work in the same time more thoroughly, through the various steps of horse machinery, as represented by the mowers, reapers, gang-turning plows, horse rakes, etc., up to the wonder-working steam plow, which seems destined, as far as machinery can, to do away with both human and animal labor. It may be objected here that certain labor has to be performed in producing and gathering our great staple crop, cotton, which can only be performed by the human hand, such as thinning the plants and picking the fruit. Granting this to be so, (although human ingenuity may yet overcome even this difficulty, as it has conquered all others that have challenged it,) and going still further, your committee are by no means satisfied that the surmounting this seemingly impossible obstacle to the almost unlimited production of this particular staple, would not work more injury than good to the Cotton States. Conceding these facts, we feel confident it cannot be denied, that we, of the Cotton States, possessing as we did, the most fertile lands, and the best appointed and managed, and most systematized human labor organization the world ever saw—controlling by our exported crops, the finances and commerce of our own *nation*, (for we had a nationality then,) and almost of the world, Midas like, producing gold with our touch; yet were like Midas, the best starved enlightened people the sun shone upon. We produced but a tithe of the actual necessaries of Southern life consumed by us—corn, bread and bacon. The luxuries of intelligent farmer life, (as the produce of the dairy, the fruit orchard, the fattening pens, etc.,) we were utterly ignorant of, or possessed in small amount, and of inferior quality. The proximate cause of this we well knew and regretted, viz: the difficulty we experienced in producing and gathering the the cereal crops. The real though remote reason, as it was the cause of that difficulty, we altogether overlooked, viz: the want of proper, thorough and deep tillage for producing, and of economical appliances for gathering these crops, only to be attained through the use of the most improved agricultural and labor-saving implements. We blamed our climate and our soil, we declared that the small grains ripened at a season when we could not spare time to harvest them, but never thought to blame and discard those venerable agricultural relics which bore upon their fossil features, (counting by the progress of other agricultural peoples, no more enlightened, no better educated, no whit our superior in brain or muscle,) the marks of many thousand years, one of the most important being the peculiar emblem of time itself.

We should then, and *must* now, by the use of machinery, by improved tillage, and thorough manuring, produce sufficient food crops to supply us fully and liberally with all the luxuries as well as necessaries of the farmer's life; and, besides all this, produce upon the plantation as much cotton as we can gather and prepare for market. And your committee assert that this can be done. Mr. Commissioner Capron's assertion that a calculation adds $150,000,000 increased productions to the annual value of the crops of the United States for every inch that is added to the depth of tillage, is within the bounds of reason, and, in the opinion of your committee, the calculation would be far more correct in its application to the South than to the North, where our long drouths and drier climate force our plants to penetrate deeper in search of moisture; and we confidently predict that we will hear no more of disastrous drouths, and failure of the cereal and hay crops in the South, when the steam plow shall have turned our lands ten to twelve inches deep, and have pulverized it sixteen to eighteen inches; and no more the complaint that we have no time to harvest these crops, and prepare them for market, when the mowers and reapers, the horse rakes and horse forks shall have superseded the wooden-tooth hand rake and the ancient scythe, and the steam-driven threshing machine shall have taken the place of "the ox that treadeth out the corn," and the hand flail. We think we shall hear much less of the scarcity of labor, when we cultivate our farms as the owner of a 70,000 acre farm in Illinois does his. We quote from a very valuable little work on "Farm Implements and Farm Machinery," by Jno. J. Thomas, published by Orange, Judd & Co., New York. He writes:

"He carries on nearly all his work by labor-saving machinery; he drives posts by horse-power; breaks his ground with Comstock's rotary spader; mows, rakes, loads, unloads, aud stacks his hay by horse-power; cultivates his corn with two-horse seated or sulky cultivators; ditches low ground, sows and plants by machinery; so that his laborers ride in the performance of their tasks, without exhausting their strength with needless walking on extended fields;" and again, as illustrative of the labor-saving power of farm machinery, from the same author: "The great value of improved farm machinery to the country at large, (he alludes to the Northern States,) has been lately proved by the introduction of the reaper. A careful estimate determined that the number of reaping machines introduced throughout the country up to the beginning of the great rebellion, performed an amount of labor, while working in harvest, nearly equal to one million of men with hand implements. The reaper thus filled the void caused by the demand on working men for the army. An earlier occurrence of that war must, therefore, have resulted in the general ruin of the grain interest, and prevented the annual shipment of the millions during that gigantic contest, which so greatly surprised the commercial savans of Europe."

Very few, if any, of us can afford the expense of a complete outfit of the most improved implements, as they are costly. Indeed, some of them can only be worked economically on a very large scale, as, for example, the steam plow; but there is not one of us who cannot largely increase the yield of his lands, and lessen by many degrees the labor of cultivating them by the use of such improved farm implements as are entirely within his power to obtain. With the two-horse steel-share turning plow, and the two-horse sulky cultivator, the farmer who owns but two horses, can prepare his lands, walking behind his plow and performing this laborious work in the cool weather of the winter season, and when the hot season arrives can mount his sulky cultivator, and with no more labor than is necessary to drive a cart, he can perform twice the amount of more thorough work than he possibly could do with the old one-horse plow, and this, too, with complete exemption from that exhaustive labor under our hot sun, which has always caused great doubts as to the ability of the Caucasian to compete, in the production of the great Southern staples, with the African or Mongolian.

Your committee earnestly call the attention of the white laboring man in the cotton, sugar and rice fields (wherever a horse can walk) of the South to these sulky-seated wheeled implements, both for the preparation of the land and the cultivation of the crops. To the white man who, from choice or necessity, labors on his farm, these implements must be of inestimable benefit. They relieve him of the terribly exhausting toil of farm work in our latitude, and not only make him the equal, but the superior, from his greater intelligence and industry, of the negro in the performance of those tasks heretofore impossible for him, under our hot sun, and in our malarious climate. Wherever a white overseer, under the old system, could, with care, live and enjoy health in the performance of his light labors, there can the laboring white man of to-day, with the use of these implements, perform an amount of daily labor (which never was, and never will be, obtained from the negro laborer with whatever adjuncts) with equal immunity from disease. The delicately raised son of a wealthy father, suddenly reduced from affluence to poverty by the inscrutable decrees of a wise Providence, as is now the almost universal condition in our unhappy country of the wealthy classes, finds himself enabled to take the place of his father's slave in his fields, and to earn by tilling the soil a decent support at least for himself and those dependent upon him, which, with the old agricultural implements, would have been a physical impossibility for him.

Under the second head, viz: a report of such improved agricultural and labor saving implements, and the results obtained by their use, as the committee have been enabled to test, they report that their chairman has used, of the turn plows, in the preparation of land, the Brinly two-horse steel-share turn plow, and *Black's gang and trench-turning* plow, also, with steel-shares and moldboards, and besides, is a sulky-seated wheeled implement, a printed description of which, with engraving from the manufacturer, accompanies this report. To the latter alone we deem it necessary to call your attention. It so far excels all others we have ever used in the preparation of land, in the evenness and depth of its work, its power to eradicate noxious grasses, the amount of work daily performed and the ease to the operator. We found it necessary, in our stiff lands, to use six mules, attached wagon-team fashion, and two operators, one upon the plow, and one (a small boy) mounted as a postillion upon the middle team.

This plow, in our opinion, cannot be recommended too highly.

Of the two-horse wheeled cultivators, we have used the Buckeye, the Excelsior No. 1, (of this a printed description and engraving accompanies this report,) the Phifer and the Stafford. The two latter we discard as being very inferior to the two former, the Buckeye and Excelsior No. 1, which we recommend very highly.

Each of these cultivators have some slight advantages not possessed by the other, that of the Excelsior consisting principally in its adjustibility, adapting itself to wide or narrow rows; that of the Buckeye consisting principally in the manner of swinging the gang of plows, and the control which the operator exerts with his feet over them, adapting it better to inequalities of the surface and irregularities in the line of plants.

Of the one-horse cultivators, (upon which the operator does not ride,) your committee have tested the Excelsior No. 2, the Knox, the Alden, the Dodge and the Mapes, and give the decided preference to the Excelsior No. 2, (a printed description and engraving of which accompanies this report,) as it will do all the work of the others equally well; and, by changing the plowshares, it will perform a great many kinds of work to which the others cannot possibly be adapted.

As an illustration and proof of the value of the wheeled sulky-seated cultivators, and the entire practicability of making a crop with them, take this short report, which the chairman at his request has from a young friend, the most progressive planter of his acquaintance, of his operations on one of his places last year:

He commenced work about the 1st of February, upon a place of naturally fertile soil, which had been lying out some four years, or where portions had been worked, just sufficiently cultivated to fill the soil with probably as large a quantity of joint and nut or cocoa grass as ever was crowded into the same space. He worked ten (10) hands and seven mules on the two-thirds time system, or four days in the week. His stock of agricultural implements was one Black's gang and trench plow, probably the first used in the State, working six mules; one Buckeye, and one Phifer, both two-horse sulky cultivators, (the latter an inferior implement, in our opinion,) and a half dozen Dickson sweeps, which, however, he did not use until his cotton and corn became too large for the sulkies. He thoroughly broke up with the Black plow to a depth of six or seven inches, planted and cultivated eighty acres very thoroughly, going over the crop with the two sulky cultivators in the four days' working time, thus working the entire crop once a week with the plow. Upon each of these implements he ran six to eight plowshares, cutting out and pulverizing the entire space between the rows of plants at each time of working. His sulky cultivators averaged about ten (10) acres each day, although they were worked by negroes entirely.

The Black plow averaged about three acres a day. His cotton, as well as corn, was planted in checks with distance both ways, and plowed both ways. The result was the entire destruction of the joint grass, and a remunerative crop, which would have been impossible to the same amount of human and animal labor, but for the improved implements. The two plowmen and four mules in the sulky cultivator, working, as he was obliged, the first three or four weeks with small bull-tongues on the Buckeye, and finger plows on the Phifer, on account of the dead joint grass, and using six plowshares on each implement, performed an amount of work equal to that of at least ten plowmen and ten mules, working the small plows upon the old stock. The work was thoroughly done, pulverizing the already well broken soil each time to the depth of four or five inches. When the crops became too large for the wheeled cultivator, he used the Dickson sweep, the dead grass by this time being removed or rotted. The chairman of this committee would have preferred the Excelsior No. 2.

Your committee would call particular attention to the Ellerbe transplanter, the invention of a Southern gentleman, a citizen of our State. We consider them of very great importance in our field crops, (although for this purpose, we think they should be made larger, deeper and stronger,) and invaluable in our gardens. As we approximate in our improved systems of agriculture to garden work and garden rate of production in our fields, they will become still more necessary. The chairman of this committee used thirty or forty of them last year in his field crops, with great success.

In conclusion, your committee would advert to the real cause for the slow introduction of and prejudice against improved agricultural implements in our country. This, they believe, entirely accounted for by the high price, and the slight and imperfect construction of the implements, both in their wooden and iron parts. The experience has been that very frequently the castings are weak and imperfect, the woodwork put up slight and badly seasoned. Again, they are built at a distance from us, making any repairs of unavoidable breakages, costly, slow and uncertain. As a general thing, the implements not being invented and constructed by parties familiar with the peculiar wants of our agriculture, are most frequently unadapted to perform all the work required of them. In the general application of their principles are they alone most valuable to us. But we want more than this, and sooner or later we must have what we need. The means are with us, and the sooner we apply them to the filling up of our wants, the better.

Your committee, therefore, recommend most strongly that one hundred of the members of this society subscribe ($1,000) one thousand dollars each to form a stock company to establish in

Charleston or Columbia a manufactory of all kinds of improved agricultural implements, from the simple bull-tongue plowshare to the lordly steam plow, if, perhaps, the company should ever become powerful and rich enough to attempt such heavy and costly work. What we want now though is something easily attained by us—the manufacture of all agricultural implements upon scientific principles. The day has passed when a farmer can expect to keep up with the progress of the age, and become independent by using the clumsy cast iron plowshare, or the still more clumsy and faulty plantation-made share, constructed of inferior materials upon bad lines, doing very inferior work, entering the ground at false angles, and consuming in the performance of its imperfect work an amount of power and labor which would suffice for twice the quantity of good work with better implements; but he who has the legitimate and praiseworthy ambition to excel in making "many blades of grass grow where but one grew before," must have the keen and glittering steel plowshare constructed upon those lines and principles proved by the investigations of scientific men, and the actual experiment of educated and progressive farmers, to be those which do the maximum of work with the minimum of power, with a temper like that of his axe blade, not requiring to be renewed after three or four days use; and he must have these, as well as all other implements, built at home. These things are seldom done by individual outlay and enterprise—least of all, can we expect them in our impoverished country. The coöperation of the means and energies of many must accomplish what the resources of the individual cannot; and your committee earnestly hope that this meeting of the Agricultural and Mechanical Society of South Carolina, may be rendered memorable in the agricultural history of the State by the organization of a company for the manufacture of agricultural and labor-saving implements.

Respectfully submitted.

JNO. B. MOORE,
Chairman Committee.

Mr. Wallace moved a suspension of the reading of other committees, and on motion of Mr. Thomas, a committee of five was appointed to report at the next meeting a scheme by which this Society may be placed upon a more substantial basis. The Chair appointed Messrs. J. P. Thomas, J. B. Palmer, J. S. Richardson, M. L. Bonham, and F. W. Dawson.

The following letter from Mr. James Bancroft, on Cotton Culture, was read by Mr. W. M. Lawton, which was ordered to be spread upon the minutes:

Athens, Ga., November, 5th, 1869.

Wm. M. Lawton, Esq., Charleston, S. C.

Dear Sir: Your valued favor of 13th ult., has been received. You have an erroneous impression with regard to my planting and raising cotton by myself. Allow me to correct the error, and say that my son, Edward Bancroft, and myself are jointly interested in farming at this place. He has the immediate charge of our planting operations; my part is of a more general nature.

We consult together on all matters, and agree that deep plowing and carefully preparing the land before planting, is of the greatest importance. After the plants are up and growing, there should be no more deep culture. The subsequent work should be only on the surface with such implements as will prevent the grass and weeds from growing, thereby allowing all the strength of the land for the benefit of the growing crop. Cultivators of the soil should commence to destroy the grass and weeds before they make their appearance above ground, and allow nothing but the crop to grow at any time.

This part of the country is not so favorably situated for raising cotton as that more southerly; still, notwithstanding this, men of experience in planting consider the results of our crops as quite successful.

On our small farm situated in the town of Athens, in 1868 we raised two bales of clean cotton of 440 pounds each to the acre, the land originally very poor. On the same ground in 1869, we are making only half a crop, say one bale of cotton per acre. The failure is caused by the unusually severe drouth of last summer, as the blooms of July only made fruit, while all subsequent blooms were dried up and failed to mature the bolls.

When we say that we have been reading agricultural books, papers, etc., for over forty years and now have on hand a small library on the same subject, we may be called book farmers.

We have read of some old farmers who consider book farming as poisonous to the land, but so far in our limited practice, we have no particular reason to fear any very serious or injurious results from reading books.

In 1852 we purchased a volume called the American Muck Book, by Browne, and published by C. M. Saxton, New York. This book contains a great deal of valuable information on all kinds of manure, with full directions for mixing various ingredients, called "special manures," consisting of Peruvian guano, gypsum, common salt, bones in various forms, soot, lime, wood-ashes, nitre, charcoal, etc., etc.

We have used special manures, as well as home-made. Each are valuable for all kinds of plants.

Home-made manure (called "gold dust") from earth-closets, well fed horses, and other animals, no doubt, is of best quality for general purposes. "Gold dust" should be protected from the influence of the sun, rain and wind, and when wanted for use, it should be covered up immediately with soil to prevent loss by exposure to the atmosphere.

Originally we planted the Dickson cotton seed. These have been greatly improved by Edward Bancroft, who has personally selected seed for the past three years from the best and most prolific plants; by this means we are able to have the best and most improved cotton seed.

There can be but little or no doubt that the Southern States are behind the age in agricultural pursuits, but we trust from the present appearances that a change will soon be made in the right direction, and that rapid improvements will soon follow.

The soil should be plowed deep, fertilizers used freely, and the land "thoroughly underdrained." By such means, with careful and strict attention, there must, and will be, very great improvement and increase in all the crops of the country.

Our land generally seems to lack vegetable matter. The best and easiest way to fill the soil with it, and at the same time enrich the land, is by growing green crops of cow peas, clover, grain or grass, and when in the right condition, turn the whole under with a good two-horse plow. In this way two crops of cow peas (the clover of the South) can be grown and turned under in one season.

Land can be used and made profitable all the year round.

We have been engaged for many days lately clearing off corn stalks (with the intention of composting them) from land where a crop of corn has recently been harvested. This same land has been plowed, harrowed, and sowed with small grain for the purpose of turning under a green crop next spring, at which time a cotton crop or a late corn crop can be planted, thus making the land work in the winter. Such things cannot be done in the Northern States, and this shows the advantages of the Southern States for agricultural purposes, and we may say equally good, if not better reasons may be given for establishing manufactures in the South.

Yours, very truly,
JAMES BANCROFT.

On motion of Mr. Richardson, a committee consisting of Messrs. J. S. Richardson, J. McCutchen, F. A. Connor, F. M. Wannamaker, and J. G. Gibbes, was appointed to nominate officers for the ensuing year, and report to-morrow night.

On motion, the meeting adjourned.

D. WYATT AIKEN, *Secretary.*

COLUMBIA, November, 11th, 1869.

Pursuant to adjournment the Society met in the Courthouse at 7 o'clock, P. M. The President called for the reports of standing committees, when Mr. Bonham moved a suspension of the reading of the various reports of standing committees.

Resolutions and motions were called for.

Colonel Thomas read the report of committee appointed last night to devise a scheme by which the Society might be placed upon a substantial basis.

After discussion, the report was not agreed to.

Mr. J. S. Richardson moved a change in the Constitution, merging the office of Secretary and Treasurer into one person. Adopted.

Mr. T. B. Clarkson moved for the appointment of a Committee on Labor, to report to-morrow night.

The Chair appointed Messrs. Clarkson, Pelham and Turnipseed.

Mr. Richardson moved for a committee to memorialize the Legislature on the subject of buying stolen cotton.

The motion passed, but on reconsideration was lost.

Mr. Clemson offered the following resolutions, which were adopted:

Whereas, the history of civilization proves that science is a necessity for the nation's advancement, and that without it there can be no permanent prosperity; and whereas, this Society was instituted for the development of the natural resources of South Carolina, which cannot be effectually done without science, especially as applied to the arts, and to effect this our people must receive the necessary education; and whereas, it is the belief of this Society, that such education requires the establishment of Normal Schools of high character:

Resolved, That a committee of ——— be appointed to deliberate on or advise such a scheme as shall best carry out this great purpose, and said committee is hereby authorized to set on foot subscriptions, receive donations, etc.

Resolved. That such school or schools be located in some healthy and economical part of the State, and that such location shall be in a measure determined by the largest sum subscribed by any county.

Resolved, That in the opinion of this Society, the thousand acres of land offered by our distinguished fellow-citizen, Col. J. E. Calhoun, of Abbeville, should determine the location of one school.

Resolved, That the donation given by the United States "for the establishment of mechanical and agricultural schools," having been given for the special purpose we have in view, viz: the advancement of technical education, shall be applied for by this Society, and that the committee is authorized to make application for the same in due time.

Mr. Haskell moved a committee be appointed to nominate delegates to the Macon Fair.

The Chair appointed Messrs. Bonham, McQueen, Barton, Duncan and Keitt.

Mr. Hampton moved that the Executive Committee be instructed to obtain a list of one hundred or more names of the members of this Society, which will guarantee reimbursement to this committee for any deficit that may arise from the next annual expenditure of ten thousand dollars, which amount the Executive Committee is hereby authorized to expend for the use of this Society. Adopted.

The President read the following letters from Messrs. John R. Dukes and J. M. Robson, relative to the inducements to use their specific manures:

CHARLESTON, S. C., November 6th, 1869.

Col. D. Wyatt Aiken, Secretary.

DEAR SIR: Our Board of Directors have instructed me to offer, through your Society, the following premiums:

For the largest product of cotton on ten acres of land, manured with the "Wando Fertilizer," $300.

For the largest product of corn on ten acres of land, manured with the "Wando Fertilizer," $100.

For the largest product of grain—wheat, oats or other small grain—on ten acres of land, manured with the "Wando Fertilizer," $100.

The award to be made by direction, in the same manner as all others, and to be in no wise controlled or directed by any person interested in the "Wando."

Very respectfully,

JOHN R. DUKES,
President Wando Fer. and Mfg. Co.

COLUMBIA, November 11th, 1869.

D. Wyatt Aiken, Esq.

DEAR SIR: In order to induce planters to keep a more correct and accurate account of the application of the Soluble

Pacific Guano and Compound Acid Phosphate, manufactured by the Pacific Guano Co., so that I could give this result in my annual supplement for the general information of the planting interest, I have offered the following prizes, and would be glad if the State Agricultural Society will take charge of the matter and arrange the details:

FOR COTTON.

1. Silver pitcher, value $75, for the greatest growth from one acre of land.
2. Silver goblet, value $50, for the next growth from one acre of land.
3. Silver cup, value $25, for the third greatest growth from one acre of land.

FOR CORN.

1. Silver goblet, value $50, for the greatest yield from one acre of land.
2. Silver cup, value $25, for the next greatest yield from one acre of land.
3. Gold medal, value $20, for the third greatest yield from one acre of land.

Yours, respectfully,
J. N. ROBSON.

On motion these conditions were accepted, and ordered to be published.

Mr. Richardson read report of Committee to nominate officers, which is as follows:

For President.

JOHNSON HAGOOD.

Vice-Presidents.

A. M. FORSTER. W. M. LAWTON.
WM. WALLACE. THOS. W. WOODWARD.

Secretary and Treasurer.

D. WYATT AIKEN.

Executive Committee.

W. S. HENEREY. EDWARD McINTOSH.
J. B. PALMER. J. P. THOMAS.
R. J. GAGE.

On motion the Society adjourned.

D. WYATT AIKEN,
Secretary.

COLUMBIA, S. C., November 12th, 1869.

Pursuant to adjournment, the Society met at 7 o'clock, P. M., in the Courthouse.

The President filled the blank in Mr. Clemson's resolution on education with the following names: Messrs. Wade Hampton, B. F. Evans, J. D. Kennedy, G. W. Morse, J. G. Clemson.

Mr. Wallace moved that the Secretary be sent as a special delegate from this Society to the Macon Fair, and that his expenses be paid.

The Secretary read a communication from Messrs. G. W. Williams & Co. relative to the use of their manures, which was ordered to be published:

Carolina Fertilizer—Premiums offered to the Planters of South and North Carolina, Georgia and Alabama.

We wish to encourage the movement among Planters to increase the product of their lands by better cultivation, and by the use of manures.

We think the poor lands of the South can be restored and made to produce abundantly, while the crops of good lands can be largely increased by the free use of the phosphates so providentially discovered in this State, from which the best of fertilizers are now made. Poor and good land cannot be made to yield equally. We propose to extend an equal opportunity to all so far as the nature of the case permits. We therefore offer the following premiums, based upon increased production over the natural growth of previous years from the same land without manure:

PRIZES FOR COTTON.

First Prize.—A Gullett gin of 40 saws, or a horse or mule of same value, and one of Dodge's celebrated steel plows, for the greatest increased production in pounds of seed cotton from five acres of land.

Second Prize.—A sewing-machine, of any patent desired, worth $150, or a cotton press of same value, for the second greatest increased production from five acres of land.

Third Prize.—A sulky cultivator, or any other agricultural implement of equal value, for the third greatest increased production from five acres of land.

PRIZES FOR CORN.

(Under the same conditions of increased production from five acres of land.)

First Prize.—A handsome buggy and harness, worth $175.

Second Prize.—A sulky cultivator, or its value in any other agricultural implement.

Third Prize.—A double-barrel gun or a rifle, worth $50.

PRIZES FOR WHEAT.

(Under the same conditions.)

First Prize.—A sulky cultivator.
Second Prize.—A wheat fanning mill.
Third Prize.—A silver Waltham watch.

CONDITIONS IN GENERAL.

The Carolina Fertilizer must alone be used as a manure. We guarantee its excellence on the basis of the analysis of Prof. Shepard.

Evidences of the use of this fertilizer, of the quantity of land cultivated, mode of cultivation and weight of manure used, as well as of the result, must be furnished, certified by three disinterested planters in the neighborhood. These statements must be made in duplicate—one copy for D. Wyatt Aiken, Esq., Secretary of the "State Agricultural and Mechanical Society," and one copy for us—which will be published in the agricultural papers.

GEO. W. WILLIAMS & CO., *Factors.*

Charleston, S. C., November 1st, 1869.

N. B.—These prizes are offered to planters in the States of South and North Carolina, Georgia and Alabama.

Mr. McIntosh moved that the thanks of the Society be tendered the various committees for their efficiency in examining and reporting upon the many articles exhibited.

Mr. Harrington moved, that the Executive Committee, if in their opinion consistent with the resources of the Society, employ Hon. Daniel Lee, of Tennessee, or some other competent person to make a geological survey of the different counties of the State, and to make chemical analysis of all manures offered for sale to the planters of this State.

Mr. W. S. Henerey offered the following:

In view of the resolution passed by the Society authorizing the expenditure of $10,000 for our next Annual Fair, we, the undersigned, pledge ourselves for the amounts opposite our names, to be paid by us in case the efforts of the Executive Committee do not meet the outlay in full, or such proportion of it as may be necessary to hold the committee harmless from loss.

The President required the Secretary to call upon the Society for signatures to the above, when the following names were subscribed, and the amounts annexed opposite their names:

James G. Gibbes	$500
D. Wyatt Aiken	100
Walker, Evans & Cogswell.	100
Johnson Hagood	100
J. D. Kennedy	100
J. M. Crawford	100
William Wallace	500
J. P. Thomas	100
James Pagan	100
Edward Hope	100
W. M. Lawton	100
John B. Moore	100
John H. Furman	100
S. C. Means	100
Thos. J. Moore	100
W. W. Wannamaker	100
W. F. Barton	100
C. J. Stroman	100
A. B. Springs	100
Richard Tozer	100
John W. Harrington	100
A. H. Waring	100
Edward McIntosh	100
T. W. Woodward	100
L. D. Childs	100
Thos. Taylor	100
W. S. Henerey	100
R. M. Lowrance	100
A. M. Aiken	100
John McRae	100
R. G. Lamar	100
John P. Kinard	100
B. F. Williamson	100
G. S. Felder	100
C. P. Pelham	$100
B. H. Rice	100
Geo. W. Morse	100
F. M. Rogers	100
G. M. Jordan	50
W. A. Ramsay	100
B. F. Whitner	100
Wade Hampton	100
D. B. DeSaussure	100
A. P. Wylie	100
T. F. McDow	100
F. L. Frost	100
J. C. Haskell	100
Wade Hampton, Jr.	100
Theodore Lang	100
S. W. Melton	100
G. M. Wannamaker	100
John S. Preston	100
A. P. Amaker	100
P. C. Haskell	100
J. D. Aiken	100
M. L. Bonham	100
Jas. W. Watts	100
F. L. Anderson	100
E. S. Irwine	50
F. A. Conner	400
S. M. Rice	100
G. A. Peterkin	100
John S. Green	100
D. L. DeSaussure	100
L. L. Young	50
W. G. Whilden	100
W. C. Hane	100

Mr. Bonham moved a delegation be sent to the Macon Fair from the South Carolina Agricultural and Mechanical Society. The Chair appointed a committee of twenty-one; Mr. Bonham as chairman.

Mr. Woodward moved that the thanks of this Society be, and are hereby tendered to the City of Columbia for its liberal contribution to the industrial interests of the State, in its investment of $8,000 for the benefit of this Society. Adopted.

Mr. F. M. Wannamaker moved that this Society highly appreciate the design and value of THE RURAL CAROLINIAN, and earnestly recommend its support by the people of the State. Adopted.

Mr. Gibbes moved that the thanks of the Society be unanimously returned Mr. A. Y. Lee for his excellent arrangement and successful management of the Fair Building during the Fair. Adopted.

Mr. DeSaussure moved that the thanks of the Society are eminently due, and are hereby tendered to the President, Secretary and the Executive Committee for their energy displayed in conducting the present successful Agricultural and Mechanical Fair. Adopted.

On motion, the Society adjourned *sine die.*

D. WYATT AIKEN, *Secretary.*

The following reports were ordered to be published:

To the President and Members of the Agricultural and Mechanical Society of South Carolina:

Pursuant to the directions of your Body, your Committee on the Necessity of Scientific and Practical Education beg leave to make the following

REPORT.

We live in an age of progress, and those who neglect education do so at their peril. All evil comes from ignorance, which is the prolific parent of wretchedness, vice, immorality and even death. As education advances, crime diminishes, and that people which inaugurates the most comprehensive system of education, not only consults economy, but its best interests. Absence of education is barbarism. The Parliament of Great Britain has at its present session appropriated $1,500,000 for primary instruction in Scotland alone. Public education in Great Britain is supported by an annual grant from Parliament of $4,500,000. This sum, added to the amounts raised by local assessment and voluntary contributions, is applied to the education of children in Great Britain, exclusive of Ireland. By the report of 1868, there were 2,130 schools in Scotland; 13,442 in England and Wales, with registered pupils over ten years to age to the number of 469,280.

The Agricultural and Mechanical Society of South Carolina is instituted to advance all the material interests of the State, and certainly that of education—and, above all, scientific education is most important, as it is essential to their development. The interests of the State are indissolubly connected with her natural resources, and as those are developed so will she advance in prosperity, power and strength.

These resources are given for use, not abuse; and, as the Nation lives forever, it is the duty of legislation carefully to guard property, and so direct that it may not be destroyed by short-sighted cupidity, which is often in direct contradiction to the public good.

The resources of South Carolina consist, 1st. In her geographical position. In that respect the State has been wonderfully favored. On the northwest it is sheltered by the mountains, which are more elevated in this and the adjoining States than in any portion of the continent east of the Mississippi. On the east the Gulf Stream runs in close proximity to her shores, and greatly influences the prevailing temperature. The cotton belt runs through the State, and the climate, with the tides due to her latitude, gives her, with her adjoining sister States, a monopoly of rice culture on the Atlantic. A line running N. W. and S. E. would cross all the main continuous geological formations of the State. The upper region is one of the most salubrious on the American continent; and on the coast, where malarious fevers prevail, we might confidently anticipate their disappearance if a system of drainage was inaugurated, having the double advantage of bringing hundreds of thousands of acres of swamp into profitable tillage, and freeing the country from sources of pestilential emanation. Her harbors are among the finest on the Atlantic coast; that of Port Royal is not excelled by any. Navigation here is never impeded by ice. Her rivers rise in her mountains and extend through the State. They once teemed with migratory fishes, now driven from their spawning-grounds by inconsiderate obstructions, of which, unfortunately, law takes no cognizance.

To those who have not given attention to these subjects a few remarks may be suggestive, showing how scientific education will conduce to the material interests of the State.

OCEAN BRINE.

The brine of the ocean contains, with common salt, iodine and bromine, two substances largely employed in medicine and the arts. By solar evaporation, aided by the prevailing breeze, the salt may be economically extracted for home consumption and exportation. The elevation of the brine by wind-mills and letting it drop over faggots, as at Bex, in Switzerland, would expedite the concentration. The elimination of bromine and iodine from sea-water would be as easily accomplished here as elsewhere by the aid of chemistry. The muriate of soda (common salt) may give rise to the manufacture of soda. To effect that, sulphuric acid is necessary. The muriatic acid disengaged by sulphuric acid is essential for making bleaching powders. The muriatic acid, when treated with manganese, (in the state of peroxide,) gives off chlorine, which is combined with lime, and thus the chloride of lime, or bleaching powder, is formed, which is also largely used as a purifier and disenfectant. Along the coast of the Mediterranean, where soda is so largely manufactured, it is the base of the celebrated soaps, which are exported from thence to all parts of the world, the palm and olive giving the oils. Both of these trees grow in our congenial climate. In connection with this subject, it is in the order of probabilities that the oleagineous seed of the cotton plant may yet become the principal object of its cultivation, making the staple comparatively unimportant and secondary. It is proper here to remark that the peroxide of manganese is found in large quantities in the interior of the State. This chain of operations, more or less chemical, would give employment to thousands of workmen, and remunerative use for capital.

FISH.

Among the inhabitants of the waters which bathe our shores is the oyster, which is found in such fruitful abundance. It is confidently asserted that the oysters found on our coast are unsurpassed; I think, finer in flavor than any other. If we can credit reports, between one and two hundred millions of dollars are invested in the oyster business between Baltimore and New York alone. The principal sites for these fisheries are in the Chesapeake. We have on our coast the finest timber in the world for the construction of sea craft. The vessels used for carrying these fish to market are small, and their construction not costly. This might be the beginning for constructing larger vessels. The canning of oysters, and their transportation over our extensive interior, should not be undervalued. Besides which, the oyster-shell makes the finest of lime, which is one of the cheapest and best of fertilizers.*

In 1860, your reporter had an interview with M. Rouhier, the distinguished Minister of the Interior of France, on the subject of the introduction of our oyster to the coast of France. He considered it of sufficient importance to send vessels to New York for seed oysters, ours being much larger and finer for cooking than those of that country.

I will here mention a singular coincidence. Since I have been writing this, I have received an English paper, by which I perceive the leading journals in that country are commenting on the decrease in quantity, and consequently increase in price, of the oyster. They remark with severity on the negligence of the government in permitting a "source of popular provision to be dried up," while the French have been, for years, using every means to increase their supply of this healthful and delicious food.

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* Seaweed is also a large manurial resource.

PISCICULTURE, (FISH BREEDING.)

At one period of history, migratory fishes, such as the shad, etc., were, throughout the interior of the State, annually secured and preserved as an article of food, more common on the table than bacon at the present day. This healthful, *brain supplying* food has now almost disappeared from our waters. At one period of history, and that not very remote, breeding and fattening ponds for fish were as common and as essential as poultry yards. I say essential, because the faithful were enjoined on certain days of the week, and during lent, to eat no flesh; and at the present day, where Catholicism prevails, cooks are in demand according to their adroitness in the preparation of that excellent food. The admirable adaptation of religion to the wants of man is here elucidated. When animals come out of the winter, poor and emaciated, and frequently unhealthy, fish are in perfection. In Scotland, at one period, the fisheries were one of the most remunerative sources of income to the proprietors of the soil. Laborers were forced by their contracts to eat salmon so many days in the week. A want of knowledge of the habits of fish and the laws which govern their production ruined the fisheries, and so diminished their numbers; they became valueless, till science and common sense caused such enactments for their protection, that they have again become flourishing. This was the case not in Scotland alone, but all *over* Europe.

The science of Pisciculture has taught us that with the return of each season, certain fish, such as shad, salmon, herring, etc., ascend the streams to their spawning grounds. The filling up of these streams with mud, sawdust, and above all the erection of dams, prevent the ascent of the fish; they finally cease to to appear at all. The artificial impregnation of fish eggs has of late years become an art, and impregnated fish eggs have their price-current like any other values. They are sent from one part of Europe to another, with as much certainty as a letter by the post. Thus fish have been introduced into streams from which they had disappeared, and others have been peopled with varieties never before existing in them. Even on this continent, Northern legislation has interfered, not only to introduce fish, but to prevent their destruction. Artificial fish-breeding has there become a regular business, as well as in Europe. Salmon have been successfully introduced from England, into the waters of Australia.

It is stated that the artificial breeding of fish has been practiced in China from time immemorial. The Connecticut River was formerly one of those in which shad were most abundant. Of late years the numbers diminished rapidly, and in order to restock it, young fish have been introduced. As high as forty

forty millions of young shad were put into that stream during the past season by one single neighborhood.

The streams in this State, above the falls, were entirely destitute of fish. Our distinguished fellow-citizen, General Wade Hampton, brought from the streams west of the mountains that valuable fish, the mountain trout, and placed them in the streams East of the Mountains. They have increased and become a resource to those living on those streams.

Your reporter has seen salmon twelve or more inches long, and hybrids of the same, which were born and reared in a basin, built for that purpose, in a room of the College of France, in Paris.

It is known that no organic entity is free from phosphorus, and to all soils fish are found to be one of the best fertilizers, which is accounted for in great part by the abundance of that substance they contain. The offal coming from the catch of fish is sedulously prepared, and is a commercial article, highly esteemed. It is in the power of every farmer who has a spring rill running through his land to have ponds from which he may supply his table with this most healthy diet to any extent. It is known that a variety of food is conducive to health. The laws which govern the production and existence of fish, being known, it is the duty of legislators (our guardians) to foster and protect this great resource, and by no means to abandon such a source of food and wealth to ignorance and private cupidity.

IRRIGATION.

The breeding of fish and irrigation may be practiced simultaneously, for in the economy of water, those ponds, constructed for the distribution of that great fertilizer may be made subservient to the breeding and rearing of fish, thus turning to account sources of abundant supply without toil or cost.

Man's first want is food, which cannot be produced without water. Its fertilizing effects were discovered at an early period of the world's history. The possibility of raising successive crops of grain, in warm climates, on sandy soils, and of producing thick swards of sweet, healthy grass on sands which, without irrigation, would continue barren wastes, attest its importance. The beneficent influence of artificial irrigation is not confined to dry climates and seasons of drouth, but we find in those climates proverbially wet, irrigation has been practiced with wonderful results. Alderman Mechi, who farms in the environs of London, in one of his practical essays, says: "Vainly did I try by solid manures, to render this vile, plastic clay into a useful pasture. It was like bird lime in winter and cast-iron in summer; poor, indigenous, and drab-colored grasses, choked and eradicated the finer kinds I had sown, and the animals wandered about hollow and dissatisfied. In the space of eighteen months irrigation has changed all this. Now fine and fattening grasses have clothed the field with perpetual verdure. It keeps three times as many animals, and the close shorn pasture indicates their affection for it, but milk and cream alike testify by their richness to the fertility of irrigation, whilst the animals are improved in condition." It is proved by analysis that irrigated grasses contain twenty-five per cent. more meat-making matter than those not irrigated.

To the sands alone of South Carolina artificial irrigation would be a never-ending invaluable resource. We say sands, because, though very striking on all soils, the effects are greater on sands than clays. By the judicious application of water, fertility would replace sterility. Water is used in the cultivation of rice on our coast, and with that single exception irrigation is unknown to the State. Yet the number of rivers and small streams which rise in and run through the State would appear as if destined expressly to give everlasting fertility. Heretofore no effort has been made to arrest this continuous flow of wealth to the sea, to be lost forever. The amount of fertilizing matter thus suffered to escape is incalcuable, and if used would carry the agricultural products, both in variety and value, beyond the calculations of the most sanguine imagination.

Nature appears to have given us, with a rare profusion, blessings, of which we take no heed. We are spending our hard-earned means to bring from a distance spurious fertilizers, and are neglecting those that are at our thresholds in profuse abundance. With irrigation, our summer drouths would become blessings to individuals and the State. What is ignored here is considered of inestimable value elsewhere. Irrigation is coincident with the practice of agriculture from all time. It was practiced in different ways in Asia, by the Assyrians, Babylonians and Egyptians, throughout Persia and Syria. In China and India its practice dates back to remote antiquity. Prescott says the canals and aqueducts were seen crossing the low lands of Peru in all directions, and spreading over the country like a vast network, diffusing fertility. Irrigation was practiced by the Aztecs in Mexico, and the Spaniards, on their arrival in that country, were astonished at the perfection to which horticulture was carried by its aid. It was extensively practiced by the Moors when in Spain. Massive and well constructed aqueducts are still extant, to show the value attached to the use of water as a fertilizer. In Italy irrigation was practiced as far back as the twelfth century. The canals subserved the purpose of both travel and transportation, and often gave the power to drive mills. Without giving a detailed account of the magnificent system of irrigation in Italy, a few examples will show the importance attached there to the art. The great

Canal of Lombardy is an artificial river constructed in the twelfth century. It is spread over the country in a thousand channels, and has made the region through which it passes one of the richest and most densely populated in the world.

The canal Cavo Marocca is one hundred and fifty miles long, and irrigates an area of 1,750,000 acres. There are on the canal 59 bridges, 26 aqueducts, and above 36,000 feet of masonry.

The canal Calusco, on the left bank of the Arco, is twenty miles long. Its mean breadth at the bottom is 18 feet, and 26 feet on the surface, with an average depth of 5½ feet.

The Canal of Langosio is twenty-seven miles long. That of Musa thirty-seven miles. The irrigating canals of Lombardy alone amount to 4,500 miles. According to Baird Smith irrigation is nowhere conducted on so grand a scale as in parts of British India. Some of the canals are like mighty rivers, and a vast extent of country secures the benefit of those waters for agricultural purposes.

The whole length of the main lines of the Western Jumna Canal is 445 miles; that of the Eastern Jumna, 500. The Ganges Canal has a total length of 898½ miles. In summing up the benefits derived from the Ganges Canal it will add to the revenue £350,000, over $1,300,000 per annum—protects from the risk of famine upwards of 11,000,000 acres, inhabited by 6,500,000 persons, paying to the State £1,800,000. When all the works are fully developed, the agricultural products cannot be valued at less than £10,000,000 per annum, which will be placed beyond contingencies, and a revenue of £3,000,000 yearly protected from fluctuation.

These are but a few of the instances of irrigation as practiced in Italy and India. To give a list of the canals of irrigation in these two countries would occupy more space than can be given in this summary (short as we are compelled to make it) of the advantages of scientific education as applied to the arts. In Germany there is a corps in government employ called meadow-culturists, who have supervision of everything connected with irrigation. Ground that is susceptible of being thus fertilized is operated upon by these experts. If the proprietor is not able to bear the expense the government advances the funds and retains the cost from the after returns. The effects are so certain that the proprietor is more than satisfied to pay out of his increased income. Thus the individual is benefited and the government gains by aiding him. Some of the reported returns of increased yield almost surpass belief.

Two instances, in this State, where irrigation has been invoked to aid production, tell their own tale. Dr. Broyles, within a couple of miles of Pendleton, Anderson District, raised 111 bushels of rice on one acre.

Dr. Parker, your distinguished chairman of agriculture, raised 200 bushels and 12 quarts of corn on one acre in Richland District. This is the more striking, as the average yield of corn in South Carolina is placed by the Agricultural Department of Washington at less than six bushels to the acre.

AGRICULTURE.

The British Association for the advancement of science met at Cambridge in 1832, when Justus (now Baron) Liebig was requested to make a report on agricultural chemistry, to be presented at the succeeding meeting of the Association.

Modern agriculture may be said to date from that time. Previous to that period the art of agriculture was in a chaotic state, consisting more of a collection of receipts and mere routine than depending upon those fixed and unerring laws which govern all production. At the present time agriculture has become a comprehensive art, invoking the aid of all the fixed sciences for its successful prosecution.

Agricultural colleges have become necessities. Such institutions have been established in every part of Europe and have been multiplied as their utility has become apparent. They have grown in numbers and importance with the increased requirements of population. Besides, government schools, both theoretical and practical, with model farms, have sprung up, and private schools have been instituted by patriotic citizens, and frequently under the auspicies of those who fill the highest positions in government. Throughout Europe the advancement is most striking. Ireland is being regenerated by her agricultural schools, among which Glassnevin stands preëminent. Scientists, such as Gilbert, Laws, Voelcker and Way, in England; Ville, Boussingalt, etc., in France; Liebig and Schleiden, in Germany, stand as beacon lights. Such luminaries have laid the foundation for a revolution in the architecture of civilization. Those fixed laws which are inherent to all matter, and which govern the action of one substance on another, can no longer be ignored without imperiling the impoverishing of the nation and the existence of government.

Science alone is competent to discover and apply those resources which give wealth, power and strength to a State, and insure its prosperity and permanence. It is the torch which lights the artist through the dark labyrinths of practice—the essential element to progressive civilization. Carolina has her peculiar geology and climate. Soils are formed from the disintegration and decomposition of rocks. Agriculture suited to the mountain region would be unsuited to the seaboard. The deductions of scientists in Poland or Canada might fail if applied to Carolina. Hence the necessity for especial study on our own ground. We have within our limits the requirements for a varied vegetation. The fig, the olive, the grape, wheat, cotton and rice, corn, the plum, apple and peach might grow side by side, yet the attention of the whole population has for nearly a century been devoted almost exclusively to the cultivation of cotton and corn.

Col. Thos. Pinckney, in an address delivered some forty years since before the Agricultural Society of Pendleton, of which he was President, warned his fellow-citizens against the persistent culture of cotton, which would end in ruin to the land and poverty to the State. Time has confirmed the prediction. It is of all crops the most precarious and exacting, and the labors of one year frequently extend into another. A few hours ride over any portion of South Carolina will show more exhausted and ruined land than could be seen in a year's travel in Europe. At the present date lands can scarce be cultivated (with the enhanced price and difficulties of labor) without a large outlay in concentrated fertilizers, mostly brought from extraneous sources, at very great expense and very doubtful value; since even if the pure article was all that could be wished, still such profound knowledge in chemistry is required, that few men, in this or any country, are competent to make an accurate analysis, or one that is reliable, particularly when phosphoric acid is a constituent. When we add to this the ease with which frauds are and can be practiced, and the great difficulty in detecting them, the best inspector would offer little security. If cotton should, for any reason, so depreciate in price as not to pay the expense of importing these fertilizers, the condition of the State would be indeed deplorable, unless before that fatal day science has come to her aid. Carolina is in the hands of the wreckers—surrounded by rocks and shoals —but with the rise of the tide she may float into deep water, and with efficient officers and science at the helm she may outride many an impending storm.

It is essential to bear in mind that there are penalties attached to the contravention of the physical laws, as unerring as that retribution which is sure to follow a transgression of the moral law. Sterility is not so much a consequence of cropping as the mode of cropping. The soil of South Carolina, admixed with sand, has been, for a series of years, subjected to the scourging culture of cotton and corn. From the nature of the cultivation required, the pulverulent earth has obeyed the ever-acting law of a depression of the high lands and the elevation of low ground. Fertility, the accumulated action of ages, has gone to the ocean. The non-decomposed inert subsoil remains to be brought into a proper state for remunerative tillage. Science is competent to the task. The fibre of our cotton can be improved, the yield increased, the expenses of cultivation diminished, and fertility carried to an extent not yet realized. To reach such results the proper laws must be observed. It is vain to hope for the consummation, unless we diffuse the knowledge which gives conviction that perseverance under certain conditions will insure success. The northern part of France was, at no very remote period, the least remunerative agricultural portion of the empire. The average product of wheat was about twelve bushels to the acre. The product now averages forty-five bushels, and that region supports large herds of cattle, unsurpassed in size and quality, with a corresponding amelioration in the condition of the population. This revolution has been effected through science, by the culture of the beet and the manufacture of sugar from that "providence." To use the words of her distinguished statesman, Mons. Thiers, "The beet has, at three separate periods, saved the Empire." France is no longer dependent on the exterior for sugar. She more than supplies her own consumption.

The cultivation of the beet has spread from the north of France to the south, and into Germany, Poland and Russia, and will probably supersede with advantage the turnip culture in Great Britain.

This amelioration has been effected by the latent local resources of the soil, without recourse to costly extraneous fertilizers, which are ephemeral in their action, and, to the nation, of doubtful expediency. It is difficult to adduce a more striking example of the power of science. The question of the continued culture of the present staples, (corn and cotton,) under the existent pressure, is problematical. In the presence of vacant lands at nominal prices, labor must enhance.

The question of labor, so imminent at the present time of transition, is one that depends on fertility. Those that can best afford to pay will command labor. We may flatter ourselves with vain hopes, but in the struggle for life the crisis will still impend, and those who deserve a better destiny will, as in the past, be forced to leave the home of their fathers, and follow the course of the setting sun, or starve at home.

The agricultural population of the State might challenge history for an example of equal morality, refinement and general cultivation, but the special information necessary to develop the resources and increase the fertility of the country was unfortunately wanting. Under the new order of things Carolina must take a new departure. Science will convert your gullied, sterile fields into rich prairies of perennial verdure, giving sustenance to a healthy and thriving stock, which will replace, with great profit, the emaciated starvelings that wander about, sad and unsatisfied, dragging out unprofitable lives. The products of the dairy, the advantages of which have not been realized by our people, will come in to fill a void in home economy. Instead of importing butter and cheese, we could supply our home wants with rich abundance, and even export to those that have heretofore supplied us. Our lands will increase in fertility with increased pecuniary returns. Our homesteads will grow in attractions as their value is enhanced by fertilization. Less labor will be required with increased productiveness. Instead of nomads and destroyers of the soil, our population will become fixed, self-sustaining, prosperous, wealthy and happy.

HORTICULTURE AND GARDENING.

The geographical position of the State, its soil and climate, aided by the abundance of fertilizing material so peculiar to the coast, the low price of lands, proximate to the ocean, with the facility of transportation, gives it advantages for the production of vegetables for exportation over less favored localities, which should defy competition. Owing to these advantages, and others, not necessary to mention, even with enhanced prices of labor, we may confidently expect that capability in the art will secure to this portion of the State a prosperity not surpassed by the agricultural products of any other. Even the poor sands, which are considered worthless for agricultural purposes, may be made to produce an amount of food per acre far surpassing the richest portion. The pea, the sweet potato, and the prolific groundnut, so oleaginous, and so valuable on that account, are particularly adapted to that region. Gardening is an art which is carried to a degree of perfection in Europe not known to us. In the environs of large cities, market gardens are productive of large profits, and the appliances for the production of early vegetables ("primeurs") are on a vast scale. Even on the shores of the North Sea, in Holland, where the rays of the sun are less vigorous than farther south, tropical fruits are raised under glass to a degree of perfection which ensures remunerative prices at home and for exportation. With us and our genial climate the expenses of fuel could be dispensed with. In this art, as in all others, skill and knowledge give confidence which ensures success, and leads to fortune.

MINERAL WEALTH.

Mineral wealth is a natural gift of primary importance and necessity, and of inestimable value, created once and forever, and given for use, not abuse. From the manner of its existence in the interior of the earth, it is a precarious source of wealth. It is a gift for all time, and is governed by laws differing from those which govern other property on the surface. It should be cared for by the nation, with sedulous attention, to prevent loss and spoliation, which ensues when they are left to the mercy of ignorance. In the matter of mines, when extraction is abandoned to private enterprise, without limit, and proper restrictions, individual cupidity has always been found adverse to, or in direct opposition to the interests of the State.

Mines of incalculable value may be destroyed beyond redemption or future efforts to work. The individual has for object the extraction of the precious material at the least possible cost, without reference to the future; whilst the interest of the nation is not so much the making of money as to secure the constant production of material for the wants of commerce and the maintaining of prosperous industries for long periods, supplying the requirements of home population, independent of extraneous sources. For in time of war, for instance, such dependence is loss of life and liberty. No guardian of public property and weal is guiltless who disregards that knowledge which creates those supplies that are to defend the neutrality of a State. Hence the inestimable value of a nation's mineral wealth. In the present stage of civilization, no nation can be self-sustaining which lacks mineral resources, or having them, neglects to teach her people the art of extracting them from the bowels of the earth, those technical arts (applied science) which ensure ability for giving them the multifarious forms required for the wants of society in times of peace and inevitable war. To extract with the greatest economy, the individual is induced to make superficial excavations, and after going to a limited extent, these shafts are abandoned, and new diggings commenced, to be, in turn, thrown aside. Thus the earth becomes pierced like a sieve, with holes open to the ingress of water from the surface. They cave in, and after a time all record of them is lost. Those that recommence work meet with those subterranean reservoirs which, with irresistible force, submerge the mine and workmen.

Again, by negligence in working varieties of ores or coal, the material takes fire, and neither water nor time can quench it till the material is exhausted. Such deplorable consequences have not been unfrequent. The disaster in such cases is not confined to underground, but the surface is affected by heat and cavings. The art of mining is founded on laws discovered after long experience, and at incalculable cost of life, time and money. These laws are dependent on the peculiar nature of mineral substances, and their manner of being and formation in the interior of the earth. They cannot be ignored or dispensed with without imperiling the resource itself, and the various advantages, present and prospective, which arise from their continuous and succcessful prosecution.

The geological formations of our State are varied—from the oldest of the altered rocks which form the highest elevation of the mountain range, (protruded from the molten mass in the interior of our planet,) in more or less continuous succession, to the alluvian sands of the ocean. Metaliferous ores have been, and are still, worked with uncertain and varied fortune, without science, which makes a sure business out of what is now but a lottery. In the formations which traverse the State the known metaliferous belt has a wide extension. It is in the range of probabilities (we might use a stronger expression) that other and richer mines will be discovered, and these probabilities would be strengthened, and perhaps ripen into certainty, with a diffusion of that kind of knowledge which bears upon the immediate subject under consideration.

Nor would it be possible to foresee the endless chain of profitable industry that might arise by developing what may now be considered valueless. The Hartz Mountains form a range which rises out of the plains of Germany. Its agricultural resources are *nil.* The potato does not come to perfection, yet the mines and metallurgical works support a population of about 50,000, all engaged directly or indirectly in them. The administration of these works is as admirable as the result is wonderful. The Ramelsburg mine has been explored since before the birth of Christ, and is still worked with advantage. The population is entirely supported from the products of the lower surrounding country. Here are schools pertaining to the pursuits of the people, viz: mining and metallurgy. This population and these immense works would long since have disappeared, were it not for the scientific administration which presides, and which has been wonderfully successful in the government of the various operations practiced in the Hartz. It is based upon purely scientific principles, and the choice of the proper man for the place. The anecdote which I here relate, shows with how much judgment each individual is chosen to fulfil the duties for which he is competent; preventing the appointment of ignorance, which is invariably followed by mischief. For capacity properly placed, is less capable of doing good than incapacity of doing harm when misplaced.

Whilst examining the operations of this remarkable region, I chanced upon an old man engaged in throwing faggots into a reverberatory furnace, used for separating silver from lead. I remarked upon his adroitness. "Yes," he said, "I know my business well, and have been engaged in throwing faggots into this furnace for sixty years!" The administration was wise enough to see that though he could throw faggots skilfully, it did not follow he could do everything else. We, unfortunately, have gone on the opposite principle, and the consequence is, we have many faggot-throwers in high places.

METALLURGY.

The art of mining and metallurgy are closely connected, and dependent one on the other. They differ, however, very materially in their nature. The former uses appliances that are mechanical, or based on the laws of physics. The latter is entirely dependent on chemistry. The reduction of ores into metals and the separation of one metal from another (for they are seldom found in a metallic state, or without admixture) is purely a chemical operation, requiring much knowledge. Almost every variety of ore requires a special treatment, and different form of furnace. Sometimes the elimination of a metal or metals with which it or they may be combined or admixed in the ore, requires a succession of complicated operations, extending through a comparatively long time, in which pure science is the guide. To effect it, profound and intimate knowledge of chemistry is essential.

It is, therefore, not surprising that ores should be sent across the ocean to be smelted, where that knowledge is possessed. None but extraordinary rich ores, of course, can bear the expense of transportation. Thus the rich ores of copper from Tennessee have been boxed up and sent to the coast to be shipped to Baltimore or elsewhere. The smelting works of Swansea, in Wales, are supplied with ores partly from Cuba, South America and the United States, when we have all the materials to accomplish the same purpose on the spot. The explanation is simple. The science is wanting.

The art of making cast or malleable iron, and their conversion into different varieties of steel, etc., are all metallurgical operations, and dependent upon chemistry. As new facts are discovered, new processes are practiced or old ones simplified. The arts are occult, and not in the order of education as practiced here. The principles on which they are founded are unknown, and mysterious to the great majority even of those who are called well educated. Hence the facility with which persons have been deceived or swindled by designing and impudent pretenders in science. These deceptions have been so frequent and flagrant, that capital in our country has become timid in all matters pertaining to mines. Such subjects require aptitude, combined with long and laborious study, generally ill-requited. But in all countries where arts are most successfully practiced, the importance of science is appreciated. Its necessity is so patent that European governments have had, from all time, special schools for the education of government advisers, who have charge of public interests of such magnitude. Thus they have agricultural colleges, schools of mines, engineering, etc., where all the sciences bearing upon different specialties are taught. Corps of officers thus created, continue in the employ of government to advise, direct and govern the interests of their several departments. They advance by grade and ability, and are requited accordingly. Thus natural resources are protected, and charlatanism banished. With such tribunals the arts advance with steady tread; while fruitless efforts and disaster are avoided. Such education is manifestly of paramount importance, and infinitely more useful and necessary to a nation's prosperity than classical schools, which absorb the priceless time of youth in acquiring effete dead languages. The one opens up new avenues to usefulness, honor and emolument; the other leads, but too often, to political aspirations, demoralizing in their tendency and subversive of all peaceful progress.

It would appear that civilization was dependent upon the science of metallurgy for its advancement. To realize its importance, we have but to imagine (if it be possible) our condition, if we were deprived of the use of the metals, or even one—iron. We have large deposits of the best Kaolin, (porcelain earth,) which is shipped crude and brought back in divers forms for daily use. It pays freight, insurance, and transportation from China, Germany (Dresden) and France. It is to the imperial manufacture of porcelain at Sevres, presided over by such men as Brougniart, Dumas, etc., that we are indebted for the advanced condition of this art.

We have limestone in abundance, yet we are indebted to other distant lands for lime, a substance so easily made, and so useful in all permanent constructions, so valuable for hygiene purposes, and so apposite and economical in giving fertility to exhausted lands.

It was science that brought the metals Potassium, Sodium, Aluminum and Calcium from the earths. We owe their discovery to the same immortal Davy, who applied science and brought forth the safety lamp. It was science in the hands of Henry that gave the principles of telegraphic communication applied by Morse, thus annihilating time and space. It is science that has taught us the composition of the atmospheres of the planets. It is science that will teach us the marvels of other worlds. It is through it that we can acquire a knowledge of the laws which govern the universe, and thus approach the Creator.

PHYSICS.

The number of streams that intersect the State, the rapids and falls of different capacities, which succeed each other almost continuously, are powers which, if made available, could be used for the support of a large population of producers to the infinite advantage of the State, but they remain useless. Manufacturing is not the genius of our population, because they lack that knowledge which gives *confidence*—the mainspring to enterprise. Notwithstanding the extortionate prices we pay for articles of necessity, we are no further advanced in supplying them than we were in times long past. It is not so much that capital is wanting, as the principles which make the mind active to invent, apply and produce. In other countries, where

Nature has been less lavish of her gifts, much is made of little that is given, and scarce a rill exists that is not used over and over for manufacturing some of the endless number of articles required by society. The division of labor perfects and cheapens commodities. Where there are no schools of science or art there is no skilled labor, and ignorance will continue to prevail. It is vain to look for a change until the incentive and motive principle is awakened. It is, therefore, incumbent on us to commence by diffusing scientific education. By degrees we shall form technical ability, which will utilize the many resources of prosperity with which we have been gifted; combinations for coöperative industry will be formed, which will result in vast production. New avenues to wealth and honor will be created, and a stop put to the drain upon our native population by emigration to the virgin fields of the West.

A gun or a watch can be made by several, each making a part, much better and cheaper than if one made the whole. It is this combination and the application of machinery that has given ascendency to manufacturing in one country over another. Liege, in Belgium, and Geneva, in Switzerland, are examples to the point. In the former, guns are manufactured in vast numbers and of different qualities. Each workman has his special part, and has his tools in his own house, and works his lifetime at one portion, which his long practice has perfected. Though he might be incapable of making a gun, he knows how to make his part. The above course is practiced in Switzerland, which supplies the world with watches, musical boxes and other ingenious articles of mechanism. Those trades and occupations are handed down in families. Those whose nature fits them for delicate work find remunerative employment. In England, Sheffield, Birmingham, Leeds, etc., are other examples. In our own country, we have Lowell and other places from whence we draw supplies, which we could manufacture much cheaper at home, provided our people were imbued with the knowledge which engenders the spirit of enterprise. We are tributary now to the North for nearly every manufactured article we use, whether in wood or metal, even to an axe-handle or a broom. Our people want mental resources, such as are given by the principles of mechanics, hydraulics, etc. Such principles have given us all the labor-saving adaptations that give ascendency—the mower, the reaper, the locomotive steam engine, the cotton gin, etc., and all those other appliances of life, once only used by the rich, which have become necessities even to the poor.

The diffusion of science is a necessity of the age. If this truth is not realized and acted on, our rich inheritance and high destiny will pass from us.

In this connection it will not be out of place if attention be called to the doings of the "Societé d'Acclimatation" of France.

That institution was established to acclimatize in France every plant, animal, bird, fish or insect, either useful or ornamental. Thus they have introduced from China two varieties of worms, which feed upon the oak and *Ailanthus*, and they confidently anticipate making a variety of silk of a sufficient strength and economy to be used for all current employs, such as towellings, sails of vessels, etc. Under the auspices of that society the ostrich has become a denizen of the poultry-yard. The field for usefulness in this line may not be exaggerated, when we remember that of the one hundred and forty thousand species of animals at present known, but forty-three have been domesticated; and of these eight have not been introduced into Europe.

The learned Buffon has said, "Men understand too little of what nature can do, and what they can do with nature."

SCHOOLS OF DESIGN, ETC.

To the civil and topographical engineer, the surveyor, the mechanic, the architect, the landscape painter, gardener, miner, the metallurgist and inventor, the art of drawing is essential. In a word, it is essential to some professions, and a most useful adjunct to all the callings of life. Its usefulness is so patent that it is scarce necessary to dwell on the subject. Schools of Design fill, therefore, an important link in the chain of arts for developing a nation's resources, without adding that they foster native talent, which produces those painters, who, in all ages, have been the admiration of the world. The works of Titian, Corregio, Raphæl, Rubens, Murillo, Van Dyke, stand as tangible proofs of inestimable value. The original cost of the "Descent from the Cross," by Pierre Paul Rubens, was about three hundred dollars. It hangs in the cathedral at Antwerp. Its reputation is world-wide, and its value beyond price. The numbers that crowd to see this wonderful piece of art are a pecuniary resource to the State, the railroads, the City of Antwerp, and the magnificent cathedral in which it hangs, which, if calculated, would be astonishing. The works of these masters hang on the walls of palaces in every clime. They adorn churches, and such is the attraction for pictures that the most humble dwellings are scarce ever without representations of some sort.

The taste for objects of art pervades all ages and all climes. The annual exhibition of paintings this year in London, is estimated to produce, in admission fees alone, a sum not less than six hundred thousand dollars. It is said that the climate and serene heavens of Italy have inspired and produced her immortal artists. We have a country not inferior either in climate or the picturesque. Why should not our artists in time rival those of Italy?

HYGIENE.

A diffusion of scientific knowledge would have a marked influence upon the health of the community at large. It would disseminate useful information about a thousand things of which no people should be ignorant. For instance, it would give to every one the proper use of prophylactics and disinfectants, and the power to foresee mournful effects from causes now unknown or disregarded. Every farmer would then be prepared with the skill necessary to ward off and combat successfully those diseases which have been from time to time so disastrous to our stock. Veternary schools or colleges we have none. Yet the amount invested in stock of all kinds is immense. Strange as it may appear to many, science is also the basis of the culinary art. The making of bread is a pure chemical operation, and the difference between good and bad bread is that of health or disease. The preparation of food throughout the South has been the cause of much ill health and mortality.

The frying-pan is an excellent utensil in judicious hands, and the frying of meats a proper savory and healthful mode of preparation, but used as it has been and still is, it has and will continue to carry many an unsuspecting victim through years of suffering to the grave.

The late Hon. J. C. Calhoun, when Secretary at War, caused a scientific examination to be made into the modes of preparing food in the army. The frying-pan was abolished as making more victims than bullets.

Science in household affairs, on the farm, for construction, in the preparation and conservation of meats, fruits, vegetables, grain, etc., etc., is ever needed and should be at the call of every head of a family, farm or factory, and in ordinary education, should and would replace with infinite advantage to private and public prosperity many branches at present taught.

REMARKS.

Among the first and most prominent objects of government is the protection and advancement of the material interests of the State. Such measures have been recognized and inaugurated with shades of difference in practice, by all the governments of the civilized world. With our past experience and under the changed order of things, we must place ourselves in a position that will enable us not only to compete with others, but, if possible, to do our part in advancing the cause of humanity. To ignore the necessity is to invite defeat and humiliation, and to suppress all the high aspirations that should fill the bosom of man.

Education has occupied the minds of the wisest men throughout all ages. The destiny of the State depends on the wisdom and patriotism of our people. If we invoke those powers which alone give prosperity, all interests will be subserved, and our people will progress under the tutilage of the Most High. The laws which are written in the heavens and in the earth, will become our laws, and we shall continue ever to advance in happiness, in power and strength, and though perfection may never be realized, we shall progress throughout all time, with unerring steps.

Science makes civilization. There is neither prosperity nor art that is not directed by those laws which are inflexibly and indelibly written in the history of all matter.

Scientific education should be extended, if possible, to all; be offered gratuitously, and made obligatory. The State would find it to her advantage. In educating her own people, she would naturally attract students from other States, and thus increase her own prosperity, as we see has been the case in France.

In our country we have been too prone to consider a college or school as consisting of a number of large and expensive buildings. Perhaps, on account of our impoverished condition and other reasons, the example of Germany would be preferable. Take, for instance, the University of Gottingen. The professors there receive their students and instruct them each in his own house. The students board where and as they please. A manifest advantage to those of limited means.

The subject of this report is vast, and might be extended *ad infinitum*, but enough has been said to prove that our material interests can only advance through scientific education, and, as that is the more perfect and the more diffused, so will our condition be improved. The foregoing remarks show conclusively that there can be no prosperity without science, and that the present condition of the State of South Carolina has been caused by its absence and the course pursued by *ci-devant* legislators. It is not by fostering, through State patronage, one colossal institution for teaching the classics, *belles lettres*, etc., etc., to those who are favored by fortune (not that such learning should be suppressed) that the object in view is to be attained. To guard, protect and develop the natural resources of the State is one of the first and most prominent duties of government, and that can only be done by the diffusion of scientific education, or by special schools instituted for the purpose of educating a certain number of citizens who are to have charge of the property of the State, and see that no detriment shall come to it. Examples of such a course and mode are found in every State north and every European nation.

The embarrassment consists in the choice of the best plan and in devising the means to carry it out. It is useless to propose a "scheme" at this stage. The manner in which the idea is carried out must depend on the importance the State attaches to the subject, and the amount she is willing or able to devote to that end. When the time comes the system can be easily combined by selecting and modifying that or those which have had the best results elsewhere.

To carry out the system consecutively and for all time—for the results cannot be felt in a day—it is essential that the main idea (the protection and development of the property and interests of the State by diffusing scientific knowledge) should be engrafted in our laws and made incumbent duties on our legislators.

"In 1868 a committee of nineteen members of the House of Commons was appointed to inquire into the provisions existing in Great Britain for giving scientific, technical education to persons requiring it. All the great agricultural, shipping and manufacturing interests of England, Scotland and Ireland were represented on the committee." Mr. Scott Russel, Esq., M. A. F.R.S., high authority on those subjects, asserts "that the pressing peril on the nation (Great Britain) in regard to manufacturing preëminence is due to the culpability of the educated classes and of the executive government, in not having organized, as the governments of other countries have done, complete education in all trade crafts." Again he says: "The value of a nation's works will vary with the excellence of the national system of technical education." So great is his appreciation of the value of technical education, that "if he speaks with respect of Oxford and Cambridge, it is because they may be considered technical schools for the divine, the doctor and lawyer." With regard to his scheme. "By masterly classification, he reduces to the modest number of 101 the number of different faculties which would be required in the technical university to teach the specialties of every occupation under the sun." This certainly seems very reasonable. Only 101 professors for teaching the best practical way for doing any and everything!

Since writing the above, I have met with some additional remarks of Mr. Scott Russel, which appear to me so peculiarly apposite to the subject in hand, that I cannot refrain from transcribing them. He "projects a system of technical education for England, but not as a theory or experiment, for the result he aims at has been already realized extensively and perfectly in continental countries. In Prussia, in Switzerland and even in the lesser States, Baden and Hanover, systematic technical instruction of all grades prepares for every kind of occupation and every branch of industry. He selects Wurtemburg as a model little country, with a population one-twentieth that of Great Britain. The scheme there reduced to successful practice is symmetrical and complete. The Polytechnic University of Stuttgart educates the highest classes of professional men, civil engineers, mechanical engineers, architects and the mercantile and commercial classes. Chemistry, in its application to the arts and manufactures, is fully taught, and there is a course of general, superior, scientific and literary education for professors, lecturers and men of leisure. The building is one of the finest in Stuttgart, and contains no less than fifty-one professors and teachers. Besides the usual lecture-rooms and studios, there are a chemical laboratory, a physical laboratory, mineralogical museums, laboratories for constructive experiments, plaster modelling rooms, rooms for drawing, a botanical garden and an astronomical observatory.

"Below this in rank is the school of trades, intended for building crafts and tradesmen of a grade immediately under the professional men and skilful masters of the technical university. The men whom it was especially designed to help in their vocation were stonemasons, bricklayers and carpenters, to be trained for future master builders, constructors of public works, subterranean works, constructors of reservoirs, water works, mill works and river works, and also land surveyors. It is besides adapted to meet the wants of plasterers, tilers, roofers, joiners, glaziers, turners, decorators, ornament sculptors, modellers, engravers, smiths, gold and silver workers, gardeners and agriculturists.

"Schools for rural occupations, farming and gardening schools are numerous throughout the country. That at Hohenheim, with twenty-one masters, has under it three practical farming schools, in three different districts, each having under its care three hundred square miles of territory. There are also winter evening schools in the villages, and the practical result is that, last year, in five hundred and twenty-three places, twelve thousand and forty persons enjoyed the privilege of agricultural instruction.

"Supplementary to the agricultural education of the farmers is an institution for the study of anatomy, physiology, training, and diseases of animals—the Veterinary College of Stuttgart. Attached to it is a group of hospitals, in which, last year, seven hundred and seventy-five horses, eight hundred and twenty-six cattle, and two hundred and thirteen dogs were treated, and at the connected smithy four thousand animals were shod.

"In order fairly to appreciate this comprehensive and admirable system of practical education let it not be forgotten that we should have to add half a million people to the little nation of Wurtemburg, to give it *half* the *population* of the State of New York.

"Passing to other continental countries, Scott Russel finds a similar state of things, and points out the vivid contrast which they present to the neglected and shameful condition of educational matters in England. The comparison in this respect between the rich and powerful kingdom of Great Britain and the republic of Switzerland, discloses a result which is almost startling. The contrast between England and Switzerland is this: that England spends more than five times as much on pauperism and crime as she does on education; and that Switzerland spends seven times as much on education as on pauperism and crime."

He says also: "The mercantile or moneyed value of a well-trained, skilful Englishman, as compared to a strong, able-bodied man who understands no craft, handiwork or art, is this: one can earn three times the value of the other; in other words, the skilled artisan is worth three times the value of the unskilled man.

"At the present time there are about a million of skilled workmen, (in England,) but there are a million of poorly skilled, and two millions of utterly unskilled men. Supposing that by education we can raise the million of lower skilled into highly skilled men, and replace them by one million of unskilled men, raised by some little education to their rank, we have, by that single act, earned for the country two hundred and fifty millions a year."

When a nation so far our superior as England, considers further progress so very essential to her prosperity, surely it behooves us to gird up our loins for the race that we may not be, with all our great natural resources, distanced in the struggle for national life.

In bringing these remarks, already long, to a close, we should feel that our mission on earth had not been in vain, if anything we have said should awaken the minds of our people to the urgent necessity of inaugurating a system which is the only hope for Carolina, assured as we are, that like the rays of the sun, it will give life, vigor and prosperity to unborn thousands, and make our State as she should be, a blessing to her people, and a brilliant light to the world.

All which is respectfully submitted.

THOS. G. CLEMSON, *Chairman.*

REPORT ON NATIVE WINES.

The Committee on Native Wines beg to report:

That they observe with much gratification the increasing interest exhibited in the department of domestic industry committed to their inspection.

Very creditable specimens of Native Wines are on exhibition from various sections of the State, which must, after a little more experience and careful preparation, furnish to our people in abundance, that great auxiliary to public morals and physical development, a wholesome and innocent beverage. They recommend the following: Rice, of Union, Silver, etc.

They beg to make honorable mention of specimens sent by Mr. J. J. Lucas, of Darlington, and Mr. Choice, of Greenville.

Respectfully submitted,
J. D. AIKEN,
R. J. GAGE,
—— FABER.

A BILL FOR THE PROTECTION OF AGRICULTURAL PRODUCTS AND OTHER PROPERTY.

Section 1. Be it enacted by the General Assembly of South Carolina, that in any county of this State which shall adopt the provisions of this Act, in the manner hereinafter specified, the boundary lines of each tract of land in the said county shall be, and they are hereby constituted, for the purposes of this Act, a lawful enclosure.

Sec. 2. Hereafter it shall not be lawful for the owner or manager of any horse, mule, hog, sheep, goat, neat cattle, or other destructive animal, to permit the said animals, or any of them, to run at large beyond the limits of the land of said owner or manager.

Sec. 3. If any of the animals mentioned in the foregoing section shall hereafter be found going at large upon the land of any person, other than the owner thereof, the same shall be deemed a trespass, and the owner or manager of such animal, or animals, shall be liable for all such damage or injury done by them to the owner of the land, or crops, or other property upon which such trespass may have been committed, whether the said animal or animals shall come from the premises of the owner in the county, in which the trespass has been committed, or shall come from another county or township.

Sec. 4. In case of trespass, as aforesaid, the aggrieved party may make complaint to a justice of the peace of the county in which the trespass may have been committed, and the said justice of the peace shall immediately issue his warrant, returnable within five days from the date thereof, compelling the alleged trespasser to be and appear before him at the time and place named in said warrant for the trial of the case. And the amount of damage which may have been sustained by the complainant shall then and there be ascertained, and judgment given for the same, with legal costs, as in other cases, and upon a repetition of the trespass, and for every succeeding one, judgment, after trial, shall be given for double the amount of damages sustained by the complainant in the preceding case: provided, that in all cases where the judgment must exceed the sum of one hundred dollars, the said justice of the peace shall transfer the case to the jurisdiction of the Court of Common Pleas, for the said county—there to be heard and determined, according to the provisions of this Act. For the payment of the damages, with costs, thus ascertained, a lien upon the trespassing animal, or animals, is hereby created, and shall attach from the date of the warrant, and shal supersede all other liens, except in cases where this State or the United States have a previous claim for public dues, upon such animal or animals.

Sec. 5. The County Commissioners, or a majority of them, for any county in this State, may declare the provisions of this Act, or any one or more of them to be of force in their respective counties, or in any township thereof, as to any or all of the animals mentioned in this Act; and in case the said County Commissioners shall fail or refuse so to declare, then, in such case, any ten freeholders in any county or township may demand from the said commissioners that the question of the adoption of this Act, or any specified parts thereof, shall be submitted to a vote of the qualified voters of said county, or township—in which case it shall be the duty of said County Commissioners to submit the question, as aforesaid, to be voted upon after three weeks' notice, publicly given, as to the times and plans of taking the votes. It shall also be the duty of the said County Commissioners to count the votes, and if it shall be found that a majority of the voters are in favor of the adoption of this Act, or any one or more of the specified provisions thereof, submitted to their vote, it shall be the duty of the said County Commissioners to declare the same as the law of force in such county or township.

Sec. 6. Nothing in this Act shall deprive an injured party of his action of trespass when the damages alleged shall exceed a sum above the jurisdiction of a justice of the peace.

Sec. 7. All acts, and clauses of acts heretofore passed, which may be inconsistent with, or repugnant to the provisions of this Act, are hereby repealed.

NOTES ON FENCING.

The rails used in ordinary plantation fences vary in length from 9 to 12 feet. The longer rails suit level ground, but the shorter rails are better for hilly ground. The width of fence row also varies. The wider the row the more stable the fence. But we frequently see fences so straight and narrow that they are easily overturned by a moderate wind.

In the following estimate, I have taken the rail at 11 feet long, lapping one foot, making the length of panel 9 feet, and the spread or width of fence row, from lap to lap, 5 feet, which give 7½ feet for length of each panel in the fence, and which are, I believe, about the most common dimensions here. There are to each panel 10 rails, 2 stakes and a rider, making 13 rails to a panel, and 704 panels, or about 9,200 rails, to 1 mile of fence. A man can easily split, in ordinary timber, 125 rails a day, and can put up 100 panels. A wagon, team and driver can haul 6 loads of 70 rails 1 mile a day, and one man can clean off the ground for 100 panels in a day. From these data, I make the following estimate:

9,200 rails	at 70 cts. per 100	$64 40
Hauling the same 1 mile	at $1 "	92 00
Putting up fence	at 5½ cts. "	5 06
Cleaning and preparing ground	at 5½ cts. "	5 06
Contingencies		3 48
Total cost per mile of fence		$170 00

A planter having his own teams, timber and hired labor, and probably shorter distance to haul, could no doubt do the work for himself more cheaply; but one who had to hire the team and hands, and perhaps buy the timber and haul a greater distance, would find it more expensive. Using shorter rails would also increase the cost.

A straight fence, made by building up rails between stakes driven into the ground and tied together at the top, might be useful in some cases where space was valuable or ground subject to inundation. Such a fence would require about 7,600 rails, and probably would not differ materially in cost from the above estimate.

Fencing by bank and ditch with two rails, stakes and rider, will be more expensive. Using the same length of rail as before, there will be required 587 panels, 5 rails each, about 3,000 rails. A bank 3½ feet high, 8 feet wide at bottom, and 1 at top, taken from a ditch of similar dimensions, will contain 3,080 cubic yards of close, hard ground; the slopes of the bank might be made more steep, making fewer yards to be moved; but in harder ground a hand could not move as much earth. If the ground should be so soft as not to stand at the assumed slope, the bank would probably not be sufficiently steep to turn stock.

The cost of such a fence would be as follows:

3,080 cubic yards of bank	at 10 cts. per yard	$308 00
3,000 rails	at 70 cts. per 100	21 00
Hauling same 1 mile	at $1 "	30 00
Putting up fence	at 10 cts. "	3 00
Contingencies		3 00
Total cost per mile of fence		$365 00

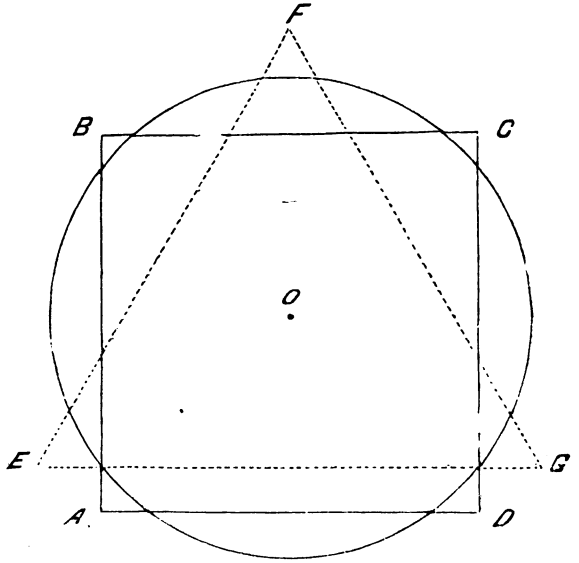
A post and rail fence, or one made with sawed lumber, would be more expensive than the common fence and would not be so movable, and would not probably be used for plantation purposes except where circumstances brought the cost of material below the market value.

We have very little experience in the South with hedges or live fences, and it is not probable that they will be much used as long as timber is so cheap and abundant, as it is everywhere now. At the North and Northwest, where fencing material is less abundant, hedges are said to make the cheapest fence.

But it must be borne in mind that it takes three or four years to make a hedge useful as a fence, and during these four years some other kind of fence is necessary to protect it and turn stock; then it requires a good deal of skill and unfailing attention to make any kind of hedge and keep it up. Of course a hedge is only suitable for a permanent fence; it may be useful in some cases, along public roads, for instance, and perhaps would be preferable to any other, especially where the practice of burning up fences prevails, as is the case near the settlements of our laboring population.

A few words on the shape of enclosures may not be inappropriate to these notes.

Of all figures, the circle has the largest area with a given perimeter, and next to the circle the *regular polygons* or figures, in which all the sides and angles are equal—the areas of these figures decreasing as the number of sides decrease. The equilateral triangle or three-sided polygon, (the smallest number of straight lines by which space can be enclosed,) being the most unfavorable of all the regular polygons, encloses the smallest area with a given perimeter.



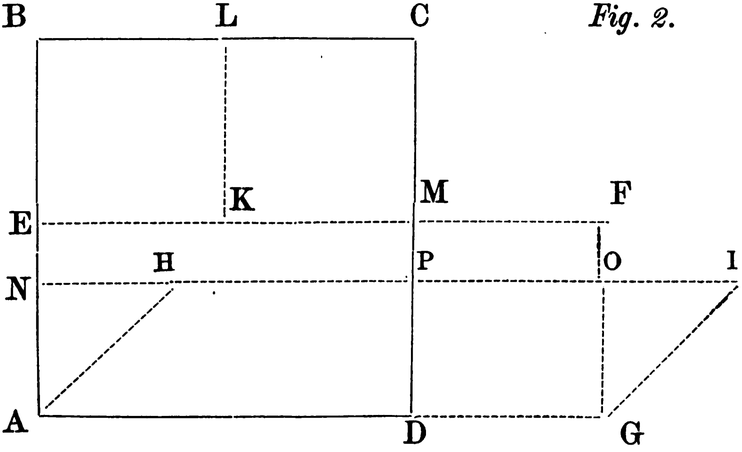
The perimeter of the circle, square and equilateral triangle each equal to 1 mile or 80 chains.

Area of the Circle	50.93 acres.
" " Square	40.00 "
" " Triangle	30.79 "

On the opposite page I give an illustration, Fig. 1, where the circle, square and triangle have the same length of perimeter or boundary lines—one mile or 80 chains. It is seen that one mile of fence will enclose in a circle nearly 51 acres. The same mile will enclose in a square 40 acres, and in an equilateral triangle only about 30¾ acres, showing what every farmer probably knows, that the triangle is the most expensive form of enclosure.

In proportion as the figures depart from the regular form the area is reduced, while the perimeter is preserved of the same length. Rectangular figures, that is four-sided figures, in which the angles are right angles, are the most convenient, generally, for farmers' enclosures—the square enclosing the largest area of any four-sided figure in proportion to the perimeter. For instance, a square of which the perimeter is one mile, contains 40 acres; while a four-sided figure with right angles, which is three times as long as it is wide, bounded by a perimeter of one mile, contains only 30 acres; while a figure with sides of the same length as the last, but angles of 45° and 135°, has an area of little over 21 acres. The last three cases are illustrated in Fig. 2. These show that to save fencing, the angles of four-sided enclosures should be made as nearly right angles as possible, and the sides as nearly as may be equal to one another. These remarks apply to the circle, and all polygons in a greater or less degree. An ellipse, which may be said to be a circle drawn out in one direction, encloses a smaller space than the circle; and the more a figure departs from the regular form the smaller the area.

Fig. 2.



The perimeter of the square, rectangle and rhomboid or parallelogram, each equal to 80 chains or one mile.

Area of the Square	40.00 acres.
Area of the Rectangle	30.00 acres.
Area of the Parallelogram	21.21 acres.

Referring again to Fig. 2, we see that the part of the rectangle, D M F G, which is outside the square A B C D, and which, in the present instance, is itself a square, is identical with the small square K L C M, showing the difference in area between the square A B C D, and rectangle A E F G to be the square E B L K. In the same way it may be shown that the difference between the rhomboid A H I G, and the rectangle A E F G, is identical with the oblong figure N E F O. The particular illustration of the comparison between the square and rectangle here used is applicable only to the present case, but that made between the rectangle and rhomboid is general where the sides of the figures are the same length.

THE GEORGIA STATE AGRICULTURAL FAIR.

Cokesbury, November 29, 1869.

General Johnson Hagood, President South Carolina Agricultural and Mechanical Society.

Dear Sir: At the meeting of the South Carolina Agricultural and Mechanical Society held on the 12th inst., Colonel Wm. Wallace proposed a resolution, which was adopted, that the Secretary be sent to the Macon Fair, and his expenses be paid by the Society.

This was indefinite, but its purport, I think, I comprehended. It meant work; work for the Secretary—to edify himself for the benefit of himself and the Society. With this appreciation of the resolution I consented to go, and accordingly left for Macon, as soon as practicable after closing up the duties of our own Fair, arriving at my destination on the 17th November. The immense throng already assembled in the city was too great for comfort, and every train brought its additional hundreds. The Fair grounds were four miles beyond the city, by rail, or three miles by wagon road, and surrounded the capacious two-story brick building, (sixty by three hundred and fifty feet,) erected as a Laboratory by the Confederate Government. I lost no time in reaching the spot, and presenting my credentials at the Secretary's office, was politely honored with a complimentary ticket.

Immediately my work of love was begun, for it was a pleasure indeed, to ramble over acres of ground covered with innumerable specimens of agricultural implements, and every possible description of mechanical invention that could be found in a national patent office. The contributions were handsome from almost every State in the Union, and with pride I observed that not the least attractive article on the grounds was a beautiful engine manufactured in Columbia.

As a mechanical exhibition the Macon Fair was an eminent success, and you can best appreciate its magnitude by conceiving of the variety, as well as the number of articles on exhibition. Twelve patented cotton presses were at work, and more than as many cotton gins, while the plows were numbered by the acre. Brinly, Dodge, Watt, Collins, Weird, Peel, Murfee, and a host of others were present with coats off practically exhibiting their plows, or were represented by some skilled and well-drilled agent who could talk as well as plow. Corn shellers and shuckers; straw cutters and cob crushers; circular saws and planing machines; churns horizontal and churns vertical; churns with dashers and churns without; stump-pullers and horse-powers; cider presses and apple parers; guano, and manure that was not guano; steam engines and railroad cars; grist mills and syrup boilers, and every other conceivable article that the husbandman or his wife ever saw or wanted was there in profusion.

Many other departments were equally well represented. Pianos Northern and Pianos Southern (?) were tuned and untuned, and thumped upon every day, and at all hours. Boots and shoes; leather and harness; cordials and wines; sorghum and sugar; preserves and jams; corn whiskey and whiskey rye; paintings in oil and paintings not in oil; counterpanes and coverlets; fruit trees and shrubbery; books and paper, and sewing machines enough to stitch up in a trice the ragged wardrobe of a Confederate regiment, were in abundance, and as irregularly arranged for exhibition as if confusion had been the object of the display.

But, sir, imagine my mortification when, as a planter, I sought for the samples of field crops grown upon Georgia soil, and found none! I looked for, and inquired for, but could never find a bushel of corn, wheat, rye, oats, barley, rice, or a bale of Georgia grown hay. Why these things were ignored, was to me inexplicable.

The exhibition of Georgia stock, too, was lamentably poor. Mr. Richard Peters entered a few cows, most of them old, and some fair bull yearlings of the Brahmin stock, and perhaps half dozen other Georgians exhibited each a bull or a cow. These, with a few Hereford heifers, and an Alderny bull yearling from Baltimore, comprised the "cattle show." Nor was the exhibition of hogs, sheep, or goats at all creditable; nearly all of them belonged to Mr. Peters, and to my eye were very inferior. The mares and colts were few and common, nor were any of the Georgia-raised horses comparable to those exhibited at our own Fair, as South Carolina raised. Of the quality of cotton exhibited, I cannot speak, but the number of bales was scarcely equal to the number of counties in the State of Georgia.

I have given you in somewhat too extended a detail a partial list of the innumerable articles on exhibition at this great State Fair, but they were not at all its most attractive features.

Tickets of admission purported free access to all portions of the Fair grounds, including, of course, the amphitheatre or hippodrome. A premium, too, was offered for the best and second best knight in a tournament, and yet when the contest came off every spectator had to pay for the privilege of witnessing it. Buying the right to see, I have a right to criticise, and unhesitatingly assert the knights exhibited no superior horsemanship, or skill in thrusting their lances. A premium was awarded the best velocipede rider, and this sport, too, was a portion of the exhibition for which an extra fee had to be paid.

Restaurants, drinking saloons, candy shops, sandwich sellers, monkey shows and anacondas, fat babies, and jugglers were scattered through the building and over the grounds, and were all sources of revenue to the Society, as but few of them paid less than a $50 license, while some paid over $1,000.

It was certainly a misnomer to call this Babel an Agricultural Fair. Its order was simply the most perfect confusion, and its exhibition of agricultural products was nothing at all. The chaotic arrangement everywhere evident, could not be justified, and there was no excuse in the reason assigned, to wit: it was a grander affair than the Executive Committee anticipated,—for every preparation was made upon a grand scale, and money was liberally expended to secure a complete success. To constitute the Secretary a salaried officer with a *per annum* of $3,000, and two assistants with $500 each, looks as if the Society were prepared for an influx of hosts of contributors and visitors from all parts of the State and United States.

As I journeyed homeward from Macon, I interrogated myself thus: what advantage has this Fair been to the Georgia planters? Satisfactorily, I am unable to answer the question. True, the City of Macon reaped a harvest; its hotel keepers and hack drivers got rich, and the Executive Committee have, perhaps, laid up a sinking fund of $25,000. Perhaps, too, many Northern inventors and their Southern agents have secured favorable publicity for their specific inventions. But have our State Fairs no other and higher aim than the above? My judgment is, they should have in view the development of all the varied material resources of the State, by the application of science to every art. While mechanics should, by no means, be overlooked, agriculture should receive a decided impetus. A laudable rivalry, an active competition amongst planters should be established, for now-a-days this is necessary to rejuvenate the exhausted soils of our prostrate South. The Macon Fair could have no such effect. For myself, while there, I neither saw an article, nor heard a reward that would stimulate me as a planter to strenuous efforts to increase my crops, diversify my labor, or add to the comforts of my home. As an agricultural exhibition, the Georgia State Fair was a failure. Among other respects it was a gigantic success.

Your obedient servant, D. WYATT AIKEN,
Secretary South Carolina Agricultural and Mechanical Society.